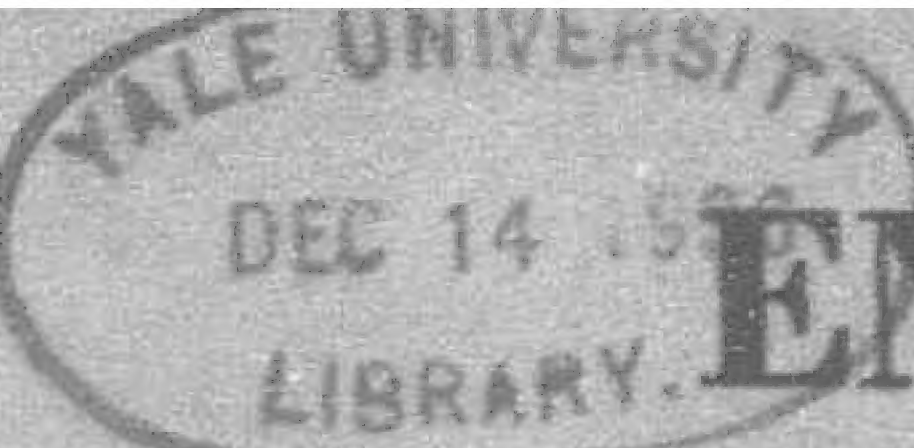


FINANCE

COMMERCE



ENGINEERING

# THE FAR EASTERN REVIEW



上海黃浦灘念四號

遠東時報

CHINA IN AUTUMN

CHINA CLAIMS RIGHT OF SELF-  
DETERMINATION

JAPAN AND THE SINGAPORE MARKET

Vol. XXXII

OCTOBER, 1936

No. 10



# N. Y. K. LINE

Founded in 1885

150 Vessels

598,000 Gross Tons

Wherever you go over the ocean, comfort and excellent courteous service are always assured by the N. Y. K.'s fast and modern liners cleaving the seven seas.

## *N. Y. K. Principal Passenger Services*

Orient-California Service	-	-	-	Fortnightly
Orient-Seattle-Vancouver Service	-	-	-	Fortnightly
Japan-Europe Service	-	-	-	Fortnightly
Japan-Australia Service	-	-	-	Monthly
Japan-South America (West Coast) Service	-	-	-	Monthly
Japan-Bombay Service	-	-	-	Monthly
Shanghai-Nagasaki-Kobe Rapid Express Service				Every 4 days
etc.				

Various Round Trip Fares quoted on very economical and convenient basis

## N. Y. K. LINE

(Japan Mail)

Head Office: TOKYO, JAPAN

Shanghai Office: 31, THE BUND

*Offices and Agencies throughout the World*

*General Passenger Agents, Cunard White Star Line in the Orient*



# The Far Eastern Review

ENGINEERING

FINANCE

COMMERCE

VOL. XXXII

SHANGHAI, OCTOBER, 1936

No. 10

## China in Autumn

WHILE diplomats confer soldiers are marching to-day in China and none may say what the future holds in store for the country. The tension that came near to the breaking point a month ago when assassins in Shanghai shot and killed one Japanese sailor and painfully wounded two others has relaxed, at least superficially, as a result of discussions held in October at Nanking between Shigeru Kawagoe, the Japanese Ambassador, and leading officials of the Chinese Government. In this period the hundreds of Japanese patrols, mounted and afoot, that appeared following the Yalu Road shooting gradually were withdrawn, and Shanghai's northern district of Hongkew again assumed its wonted drabness. Only once during this period and for reasons that have remained undisclosed, was there a flare-up of armed activity, when Japanese forces abruptly appeared in strength on the streets and many sections of Hongkew were enclosed in barbed-wire barricades with machine-guns mounted at street intersections. One reason given for this demonstration at the time was that the Japanese military command wished to assure themselves that they could at a few moments notice wholly block off particular sections of Hongkew, should new emergencies arise.

Under the great provocation of a series of murderous attacks, in which a number of Japanese nationals and individuals connected with the Japanese armed services were killed, their leaders have displayed a commendable degree of restraint. It seems evident that they have accepted the common viewpoint that these assassinations were inspired and aimed against the Japanese only secondarily, and that the primary political motive of these killings has been to embarrass, and, if possible, overthrow the existing regime at Nanking. The fact that those responsible for the slaying of the Japanese sailor, Asamitsu Taminato, and for the wounding of his companions, are still at large is a circumstance that carries its own sinister significance.

### Conferences at Nanking

In the initial phase of the talks with the Japanese Ambassador the Chinese acceded to a request made by the Japanese for a meeting between Ambassador Kawagoe and Generalissimo Chiang Kai-shek, and to do this Chiang Kai-shek flew north from Canton. What the exchanges were at this conference between Chiang Kai-shek and Ambassador Kawagoe, and what was said at the half dozen subsequent meetings which the Ambassador had with the Chinese Foreign Minister, General Chang Chun, are matters not made public. All these conferences, it is said, were conducted in a spirit of cordiality and friendliness, and it is not to be doubted that both sides are earnestly striving to reach an amicable solution of the various problems. The statement that was issued following the meeting of Chiang Kai-shek and Ambassador Kawagoe was so carefully phrased that by no possible interpretation could any portion of it arouse resentment, either in China or in Japan. This communique was as follows:

"Ambassador Kawagoe met General Chiang Kai-shek at 10 o'clock in the morning and had a two-hour conference with the head of the Executive Yuan. At the outset, General Chiang expressed profound regret for the Chengtu incident and the subsequent unfortunate events and manifested the intention of the Chinese Government to prevent the recurrence of such incidents. He then expressed desire that the two Governments co-operate in improving relations between Japan

and China through the normal diplomatic channels in a spirit of mutual concession and equality.

"In response to the opinions advanced by General Chiang, Ambassador Kawagoe pointed out that the Chengtu and ensuing untoward incidents cannot be regarded as mere cases of attack and injury but constitute events that cannot but have serious effects on Sino-Japanese relations. In view of the circumstances, the Tokyo envoy urged that the National Government demonstrate sincerity in effective positive co-operation with the Japanese in the common interest of the general situation in the Orient.

"General Chiang endorsed the Japanese proposition to make joint efforts to adjust relations between the two countries and thus contributed to the establishment of Far Eastern peace."

### Subject of Conferences

Discussing the Nanking negotiations, the *Tokyo Asahi*, October 22, stated that a stage had been reached where the only alternatives were either an agreement or a breakdown. It is evident, however, that the negotiations on both sides are being carried on with goodwill and it is to be hoped that in the end an agreement will be reached which will result in a situation that will be mutually beneficial. As noted above, nothing has been officially disclosed as to the course of the negotiations at Nanking but there has been some inspired guessing, and some very closely reasoned deductions have been printed in the newspapers both in China and Japan. Probably the most reliable indication of the suggestions which have been made from the Japanese side for the settlement of outstanding difficulties was contained in a recent issue of the *Tokyo Nichi Nichi*, which stated that Japan was desirous of attaining the following objectives:

- 1.—China should control all anti-Japanese agitation and suppress all anti-Japanese boycotts.
- 2.—China should recognize the special nature of the five provinces of North China and agree to conclude a written agreement to this effect.
- 3.—China and Japan should co-operate in a joint anti-Communist drive, and to this end the two countries should enter into an agreement covering all the territories of China, in which the military co-operation of the two countries under the direction of the Tokyo General Staff in the common cause would be emphasized.
- 4.—Japanese advisors to be appointed in the central and local governments.
- 5.—China is to consent to a general lowering of tariff rates. A Sino-Japanese joint commission is to be appointed to discuss this matter. The eventual aim would be to create a China-Japan-Manchoukuo "economic block."
- 6.—Agreement to be reached for the establishment of an aviation route between the Japanese naval base at Fukuoka and Shanghai.
- 7.—China to surrender to the Japanese authorities all Korean residents in China who are suspected of anti-Japanese sentiments.

### British Credits

According to intimations in the Japanese newspapers, China has voiced her principal objection to the second and third of the above-named propositions.



On October 15, the *Tokyo Nichi Nichi* published a report alleging that various foreign governments, notably so the United States and Britain, were laying a restraining hand on China in her negotiations with Japan. It was alleged that as a result of this sympathetic interest by the Ambassadors of various foreign countries China had dreams of placing further reliance on the Occidental Powers. The points particularly referred to were the recent granting of credits to China, by Britain, the influence of the British in Chinese railways, and America's influence in aviation in China. It may be mentioned in passing that the granting of credits to China by Britain is a matter of great significance, viewed from all points. The following are excerpts from a statement, issued at the time of the announcement that the credits would be forthcoming, made by Sir Frederick Leith-Ross, British economic advisor :

"I hope that British exporters will take advantage of the turn in the tide when it comes. They must expect to face keen competition and enterprise, and expert salesmanship will be required, as well as readiness to take some risks. Needless to say, they must make a careful study of market requirements and establish the closest possible contact with their Chinese customers. Indeed, in every field of business, co-operation with Chinese interests should be aimed at.

".....The development of China will require the importation of capital goods, and this is probably the most promising field for British exports. Such exports would be greatly facilitated by a flow of credit to China, where capital is scarce, and the yield under proper management should be fully remunerative. In the past the United Kingdom has done much to develop the railway system of China, but unfortunately many of the loan obligations thus incurred have not been fully met. These defaults have seriously prejudiced the credit of China, and her efforts to secure finance for new development purposes have been correspondingly hampered. The National Government appear genuinely anxious to settle outstanding obligations, within the limits of their financial possibilities, and also to remedy the serious defects in the administration and management of the railways, with a view to enabling them to meet their charges. It must be borne in mind that the defaults are, in the main, a heritage of years of civil strife and social disorganization. If a reasonable settlement could be reached in regard to these old debts, the way would be open for financing extensions to the present railway system, and thus opening vast stretches of country to foreign trade. No other form of enterprise could be more beneficial both to China and to the United Kingdom, and every effort should be made to overcome the difficulties.

"Apart from railway financing, which calls for long-term credit, the possibilities of arranging middle-term credits deserve exploration. Such credits would be of particular value for financing public utility schemes. I have been impressed by the energy and capacity with which the municipal authorities are developing local projects of this character, and I think the British manufacturers and exporters should consult the banks operating in China, as well as the Government departments concerned, with a view to obtaining finance for soundly planned projects.

"There are also many openings for the investment of private capital in properties or undertakings in China; but, if investors are to be attracted to such ventures, confidence must be re-established by abrogating any measures that have the effect of discriminating against foreign capital, and, as regards real estate, by securing that the legal rights of mortgages are fully protected. Foreign capital cannot be expected to assist China unless it is assured of fair treatment."

### Chinese Papers Hostile

The more rabid of the Chinese newspapers are creating an atmosphere which tends to make a successful outcome of the negotiations difficult. The *Chung Kuo Jih Pao* averred that Japan's practice in carrying on negotiations with the Chinese government, at the same time that her officials were securing the signatures of local officials in North China, "was a typical Japanese maneuver, as the aim was to present China with a *fait accompli*." This journal made the provocative observation that Japan was certainly wrong if she thought that she had succeeded in hoodwinking the world. The *Hsin Min Pao* said it preferred to see the negotiations

break down rather than to witness a Chinese concession which would mean a violation of General Chiang Kai-shek's declaration regarding the protection of China's territorial integrity as well as the nation's wishes.

It may be mentioned in passing that the negotiations at Nanking are dragging along slowly. There is no real friction, but merely minor differences of detail. However, General Count Terauchi, War Minister, told the press October 26, in Tokyo, that if Mr. Hirota's cabinet should be unable to settle the question of Sino-Japanese relations there would be no course left for it but to step out with good grace. Questioned by *Domei*, the War Minister added that he could rely on the Foreign Office to settle all outstanding Sino-Japanese problems.

The Chinese professors and students in the North particularly, by agitation which takes various forms, are adding to the difficulties of reaching a solution. University professors both at Peiping and Shanghai during the month issued manifestoes, the main theme of which was that the Nanking Government should immediately dispatch troops to east Suiyuan to reinforce the local garrison and "suppress the alien-instigated and supported local bandits." A circular telegram dispatched to the Central Government in Nanking by 25 university professors and industrialists in Shanghai urging that a strong stand be taken by the Nanking Government against Japan, contained as its first signature Wang Pai-sen, Principal of the Nanyang Middle School. Copies of the telegram were sent to provincial government and military authorities, and to diplomatic representatives. The general tenor of the Shanghai and Peiping manifestoes was the same, the following being a summary :

The Nanking Government should concentrate the entire strength of the country in its negotiations with Japan in accordance with the principle of non-impairment of territorial and administrative integrity; Sino-Japanese negotiations should be conducted openly and the Government should publish from time to time the proceedings of the negotiations; oppose any form of Japanese interference in Chinese industrial affairs and all Japanese military activities and the establishment of any special service organ; oppose the establishment of any special administrative organ within Chinese territory under alien influence and under whatever name; oppose the Japanese claim to a special position in North China; oppose the development of North China through utilization of foreign aid, thereby encroaching upon and disposing of natural resources; the Government should take armed measures to suppress smuggling (There was also the demand for the sending of troops to east Suiyuan, already mentioned).

The manifestoes by the professors were followed by a manifesto by the so-called Students National Salvation Association of Peiping, the main theme of which was the "danger" of a compromise. In this connection the students' manifesto said :

"Such a compromise, if concluded, will mean a most serious blow to the Chinese movement for national salvation and deprive it of all its spiritual and material conditions. In other words, if such a compromise should be concluded, China will lose its status as an independent country and the Chinese people will never be liberated."

### Economic Co-operation

With regard to the matter of economic co-operation, particularly in North China, it will be interesting to examine some of the various projects that have been put forward. According to published reports, the plans for Chinese-Japanese co-operation in North China will include developments in three directions: Means of communication, particularly the construction of new railways; tapping of natural resources, particularly the digging of further coal and iron mines; and the development of industries, particularly the construction of cotton mills. Three railways are being planned. (1) Tsangchow-Shichichwang Railway, running from Tsangchow, on the Tsing-pu line, to Shichichwang, on the Peiping-Hankow Railway. According to present plans, the South Manchuria Railway will supply all the necessary materials, technical personnel, etc. A sum of \$27,000,000 has been set as capital for this railway venture. When completed this railway will connect with the narrow-gauge line from Shichichwang to Taiyuan, in addition to the trunk lines just mentioned, thus reaching Hopei, Shansi and Suiyuan.

(Continued on page 453)



# China Claims Right of Self-Determination

By GENERAL CHIANG KAI-SHEK

*This message of General Chiang Kai-shek, President of the Executive Yuan and Chairman of the Military Affairs Commission, to the English-reading public, both in China and abroad, in commemoration of the 25th anniversary of the founding of the Chinese Republic, was released through the International Publicity Department of the Central Publicity Council on the eve of the "Double Tenth."*

\* \* \*

WITH the introduction of steamships, railways, wireless, and airplanes, international relations have steadily undergone vast changes, so that what takes place in one country is soon broadcast and known in all others. To the rest of the world China to-day is therefore no longer the *terra incognita* of the past. But it has often been rightly pointed out that if people have more information about China now, they have also more misinformation; better known is China, but not better understood.

From the very start of her Republican career China has striven to secure national unification within and international equality without, a justifiable aspiration that is inherent in any awakening nation. Issues involved in this transition from the old to new order—based on the new conception of national and social life affecting her home government and interested foreign Powers—have given birth to such an unusually complicated situation within the country that an impartial and objective judgment from outside is not only difficult but almost impossible.

Thus China's struggle for real national existence and for modern statehood has more often than not been misinterpreted, deliberately or otherwise. Even to-day China is still being denounced in certain quarters as a highly chaotic nation, incapable of exercising its administrative authority, and unable to maintain peace and order within its territory!

This misunderstanding on the part of certain people has caused some Powers to withhold sympathy for China's endeavors, thereby nullifying much of her efforts to overcome the difficulties which long ago the rule of the Manchus left behind.

As I am requested to give a short message to the English-reading public, both here and abroad, to commemorate the twenty-fifth anniversary of our Republic, I think I can choose on this great day of national rejoicing no better topic than this—China's Unification and Reconstruction—with a view to clarifying whatever misunderstanding there still exists concerning China.

The first point to which I call the attention of all foreign friends is that China to-day is no longer the disunited country of past years.

For more than half a century before the founding of the Republic in 1911 there had been a steady weakening of the Central authorities and a tendency toward provincial autonomy. The tendency then prevailing for the provincial governments to defy

the Central Government's control was accompanied by the rise to power of military commanders, whose selfish ambitions for more power repeatedly led to conflict with rivals or the Government forces, resulting in misery and disaster for the people.

## The Record of a Decade

In 1927, when the National Government was first established in Nanking, how much unrest existed in different parts of the country!

Then came Communism, and with it came greater havoc and desolation, more suffering and damage. Cities and towns fell into the hands of the Communist bandits, lives sacrificed, cultivated land laid waste; there was almost no human labor except in pillage, arson or massacre. If such a reign of terror existed elsewhere, the ruling power would have, in despair, given up any hope of complete recovery.

But fully realizing that China can make no real progress with its program of national reconstruction until peace was established throughout the country, the National Government of China, undaunted by the Herculean task confronting it, has ever since its inauguration endeavored to remove all obstacles to unity and order.

With courageous determination and with a spirit of sacrifice for national regeneration, the Government went ahead step by step with its thorough and well-planned campaign against the Reds and other unruly elements. In 1933 Kiangsi, the stronghold of the Red army, was retaken, and gradually Hunan, Hupeh, Szechuen and Kweichow were also cleared of Communist bandits and militarists.

The remnant Communists, now encompassed in a few scattered regions, can be exterminated without much difficulty. At present Communism is no longer a real menace to China.

Unity and orderly administration through the suppression of Communist-banditry and the Fukien revolt are to-day further enhanced by bringing into the fold the Liang-Kwang provinces

which until very recently had claimed semi-independence.

The second point I wish to emphasize is that against great odds China is forging ahead in the execution of her program of national reconstruction.

If the forcible suppression of militarism and Communism was a hard task, economic and political rehabilitation of the vast area already laid waste is one requiring even more courage and stratagem, more originality and thoughtfulness. There being no effective organization among the people in the once Sovietized zones, the Government modified and introduced the old system of *Pao Chia* for mutual supervision, where by joint responsibility placed on the neighbors of all inhabitants makes it difficult for undesirable elements to mix among them, and so lessens the danger of their being led astray in thought or in action.



Generalissimo Chiang Kai-shek, President of the Executive Yuan and Chairman of the Military Affairs Commission



### Regarding Taxes

To lighten the burden of the farmers, who constitute 80 per cent of China's population, the Government promulgated in 1934 mandates, first pledging itself never to increase the surtax on farmlands and then abrogating burdensome taxes and obnoxious levies already in existence. More than 5,000 such taxes have been abrogated, amounting to some \$50,000,000 a year.

In recent years the National Government has applied huge sums of money to water conservancy in general and to the repair and building of dikes and dams in particular. A total of \$35,350,000 was spent in 1935 on conservancy projects alone. If this work continues one may expect that much of the damage resulting from drought and famine may be avoided.

Co-operative enterprises have been promoted, the total number reaching 26,224, of which 12,517 were established in 1935 alone. In view of their growing importance, the Ministry of Industries has added to its departments a new one of co-operatives. It also has very recently established an Agricultural Credit Bureau, with an authorized capital of \$6,000,000, to be subscribed equally by the Government and the public. Its purpose is to utilize the combined strength of the people and the Government for the extension of credit to farmers and the distribution of farm produce.

In the field of communications progress can be shown by a few statistical data. The mileage of railways has increased from less than 8,000 kilometers in 1925 to approximately 13,000 to-day; motor roads already open to traffic measure 96,345 kilometers, and those now under construction 16,040 kilometers.

Whereas in former days it took months to travel by boat or on horseback from Nanking to Canton or from Nanking to Kweiyang, the same distance may be more comfortably covered by motor-car in a few days.

### Aviation in China

Air routes 10 years ago were unheard-of in China; to-day airplanes fly regularly from Shanghai to Hankow, Chengtu, Peiping, Canton and even to Sinkiang. The amazing strides made in civil aviation can best be illustrated by the record of one company, the China National Aviation Corporation, which had in 1929 only 354 passengers but carried 10,304 in 1935.

Nor is it in economic reconstruction alone that China makes progress; great efforts are also being made to improve the efficiency of public administration, to promote public health, to enforce compulsory education, to bring about financial reforms. Here I have merely indicated some of the most outstanding features of China's endeavors for reconstruction. But judging from this summary, brief as it is, I can say without exaggeration that at no other time has China accomplished so much along all lines within a period of eight years.

It is not my intention to boast, on this happy occasion of China's silver jubilee, of past achievements of the National Government, for there is still gigantic work left to be done. What I intend to bring out by making a brief review of past events is this:—China is capable of doing great deeds by her own efforts, capable of wiping out the destructive forces of militarism and Communism, capable of undertaking constructive measures for the welfare of her people—in short, capable of setting her own house in order—provided that she is given the chance to work out her destiny uninterrupted and unembarrassed.

This chance we want, and this chance we must have. To give China an opportunity for internal development is not only to render her indirect friendly assistance, but also to advance the cause of world peace; because with her peace-loving millions and her unlimited resources, China, once prosperous and strong, will be one of the greatest stabilizing influences in the family of nations.

\* \* \*

### Communications in China

Amplifying the foregoing, another statement written by General Chiang Kai-shek on the occasion of the celebration of the Anniversary of the Republic for the *North-China Daily News*, may be quoted in part as of special interest with regard to communications within China. This excerpt is as follows:—

For thousands of years, China as a nation has depended upon her farmers, but now the Government will not be content to remain in the position of a farming country. While in Yunnan last year I stated that, "To-day, when a country wants to stand on an

equal footing in the family of nations, the fundamental condition is the development of industry. Therefore, if China is to struggle for equality and freedom with other nations the first important thing for us to do is to develop from a farming to an industrial nation."

The progress of industrial China cannot keep pace with Europe and America, but in recent years there has been much improvement, especially along the line of communications. For instance, in 1921 there were only 1,185 kilometers of highways, in 1927, they still did not exceed 30,000 kilometers, but at the end of last year we had 96,345 kilometers already opened to regular traffic. Besides, there are 16,040 kilometers under construction, and 50,543 kilometers projected. In old days, it was very inconvenient to travel in the interior, but since the construction of highways, it has been possible to start from Nanking by motor-car and to reach Lanchow in the North-West, and Kungming in the South-West, not only with more convenience, but also immensely quicker.

Travel by aeroplane in China was not possible ten years ago. The China National Aviation Corporation started the Shanghai-Hankow air line in October, 1929, and it was later extended to Ichang, Chungking and Chengtu. Last year services were opened from Chungking to Kweiyang and Yunnan. In 1933, two new lines were opened—between Shanghai and Peiping, and Shanghai and Canton. In the same year, the Eurasia Aviation Corporation was established, opening the Shanghai-Sinkiang line, Peiping-Canton line, Lanchow-Paotao line, and the Shanghai-Chengtu line. In addition the South-West Aviation Corporation also maintains two lines, one from Canton to Lanchow, via Wuchow and Nanning, and the other from Canton to Pakhoi, via Muming and Kingchow. This new form of communications did not appeal very much to the travelling public when it was first inaugurated, but recently its expansion has been exceedingly rapid. The number of passengers for the China National Aviation Corporation in 1929 was only 354 persons, but it jumped up to 10,404 persons in 1935. Similar increases are reported by other companies.

The feature of communications that has the closest relation to the welfare of the country and people is the railway. During the ten years from 1921 to 1931, except for a few lines in the North-eastern provinces that were still under construction, railway construction in China Proper was almost at a standstill. After the inauguration of the National Government, a Railway Ministry was established in 1928, but during its first three or four years only work for the improvement of the various existing lines could be done. Since the advent of the year 1932, however, railway construction has entered into a new stage. The following is a list of newly constructed railway lines during the past few years:—

- (1) The Chekiang-Kiangsi Railway—from Hangchow to Nanchang
- (2) The Nanking-Canton Railway—as far as from Nanking to Sunkiapu
- (3) The Huinan Railway—from the Huinan coal mine in Lohochen (west of Ponpu) to Yuichikow on the opposite bank of the river to Wuhu
- (4) The Tungpu Railway—this railway starts from the Tatung Station of the Peiping-Suiyuan line and goes to Funlingtu, opposite the Tungkwan Station of the Lunghai Railway, via Taiyuanfu. Except for the section north of Taiyuan to Pingyuan, which is still under construction, the rest of the line has been completed

The following is a list of new extensions of old lines:—

- (1) The Chuchow-Siukwan section of the Canton-Hankow Railway, which has already been completed, and will soon be formally opened to traffic.
- (2) The Tungkwan-Paochi section of the Lunghai line—extension has already been completed west of Tungkwan to Hsanyang via Sian, while the section between Hsanyang to Paochi will also soon be completed.
- (3) The Soochow-Kashing section of the Nanking-Shanghai Railway, which was completed in July last and formally opened to traffic.
- (4) The Tsao-ngo-Zahkow section of the Shanghai-Hangchow-Ningpo line, construction of which will be started as soon as the Chientang River Bridge is completed. This bridge has a length of 3,500 feet, sixteen spans and two traffic decks, the upper one for motor-cars and the lower for railway tracks. The work is being rushed and the date of completion is very near.



Besides the above the following lines are now being planned, viz., (1) the Chengtu-Chungking line; (2) the Paochi-Chengtu line; (3) the Hunan-Kweichow line, from Chuchow to Kweiyang; (4) the Taokow-Tsinan line.

The total mileage of the Chinese railways has not yet reached the mark of 10,000 miles, while Great Britain has a total of 24,000 miles, France, 39,000 miles, Germany, 36,000 miles, Japan, 17,000 miles, and America, 249,000 miles, a fact that should make us feel ashamed. However, if we can continue our efforts at the present rate of progress, I think we shall soon catch up with the accomplishment of the European and American Powers.

### Nation's Co-operation Essential

There are, of course, many causes for the weakness of China and the poverty of her people, but among the most important is the inertness of her industry. Consequently I have fully realized that for national reconstruction to-day there is nothing so important and necessary as economic reconstruction.

In August, 1935, I issued from Chengtu a telegram to all our citizens through the Chairmen of the various provincial governments pointing out that economic reconstruction for the solution of the problem of the living of the people must be pushed forward with the actual force of the local governments and the co-operation of the people before it can be a success. I also pointed out eight principal works for the People's Economic Reconstruction Movement, viz.,

- (1) Promotion of the labor conscription system.
- (2) Development of agriculture.
- (3) Encouragement of exploitation of barren land and cattle raising.
- (4) Control of consumption.
- (5) Industrial development.
- (6) Opening of mines.
- (7) Facilitating the transport of commodities.
- (8) The control of currency and finance.

The importance of these principal works was emphasized again in my article concerning the People's Economic Reconstruction Movement published on the day of the Anniversary of the Republic of China last year.

In July, 1936, a People's Economic Reconstruction Movement Commission was established in Nanking, while orders were issued to the different provinces and special municipalities to form branches of the Commission, and to various districts, to form sub-Commissions. Now all the branches and sub-branches of this Commission have been formally inaugurated and soon it will spread throughout the nation. Since we are combining the efforts of the Central and Local Governments and striving with zeal and enthusiasm to make our people realize the eight aims mentioned above, I sincerely believe

that after a few years the position of our nation and the standard of living of our people will be considerably elevated.

\* \* \*

### General Chiang's Appeal to Young China

China's present unification is the most important foundation of her national reconstruction, her recovery of lost rights and her national rejuvenation, General Chiang Kai-shek told 10,000 Boy Scouts and Girl Guides who marched past him at the Central Stadium, in Nanking, in a most impressive review in celebration of National Independence Day. China's unity to-day, he said, is the crystallization of untold blood and sweat shed by her 400,000,000 people, and, therefore, commands the support of every citizen. The spirit displayed by the nation's Boy Scouts and Girl Guides at the review clearly demonstrated the readiness of the Chinese youth to obey orders, to uphold discipline, and to support the Government. It was hoped that all Chinese citizens also would observe rigidly the commandments for Kuo-Min Tang members and do their part in restoring the ancient Chinese virtues, and standing together, strive for the regeneration of the country.

Disunity has been the main reason why China has been looked down upon by other nations, why the San Min Chu-I has not been fully realized, and why the plight of the people has been aggravated. In order that China may be saved, that the nation may be reborn, and that China may enjoy full equality and freedom, the whole country must first be united. Now that political unity had been achieved, the whole nation should pledge their fullest support to the Government, obey orders, and stick to one another through thick and thin. Enjoining his listeners to treasure a genuine national consolidation, General Chiang said the fundamental way to strengthen the foundation of unity and to realize a national rebirth was to restore China's ancient virtues, which were loyalty, filial piety, magnanimity, love, sincerity, righteousness and peace. With these restored to the people, China would be able to enjoy equality and freedom in the family of nations. What was more, China in future would be looked upon as a first-class nation.

In order that these ancient virtues may be restored, General Chiang exhorted his vast juvenile audience to follow the twelve rules of conduct laid down by the fifth Kuo-Min Tang Congress last year. Of these, the first two call for loyalty and filial piety, which, in the view of the Congress, are the pillars of patriotism and domestic harmony. If every Chinese can practise these twelve commandments, China's lost rights could be recovered and the nation regenerated. He urged the Scouts and Guides to take back with them the twelve rules of conduct for the enlightenment of their parents, relatives, teachers and friends. Concluding, General Chiang (who is President of the National Boy Scouts Association) reminded his hearers of the importance of health, for they must have strong physical bodies before they can perform their duties to their country.

## SEVEN-YEAR PLAN OF PEIPING-HANKOW RAILWAY

A Seven-Year Plan, involving the expenditure of \$22,000,000 for the readjustment and improvement of the Peiping-Hankow Railway service, has been approved by the Ministry of Railways. According to the Railway Administration, the Plan provides for improvements in both the technical and financial aspects.

On the technical side, attention will be paid to the renewal of decayed wooden sleepers, repair and re-building of bridges, installation of the latest mechanical devices, increase in the number of locomotives and rolling-stock and the modernization of the railway workshops. On the business side, steps will be taken for settlement of debts in arrears and amortization of existing loan obligations, improvement of the budgetary system and the credit of the Railway Administration.

According to the estimates drawn up, 300,000 wooden sleepers on the entire line will be replaced; 70 sets of special steel crossings will be required for the sidings at railway stations, and 5,500 tons of new steel rails will also be required. Besides reconditioning the bridges at Sinloh and Fengchun, the huge Yellow River bridge near Chengchow, in northern Honan, will be re-built at a cost of

\$7,500,000. Engineering work is to be started early next year and will be completed in five years.

Repairs to other railway bridges and structural work will be carried out in five periods at the following five sections: (1) Hankow (Hupei)-Sinyang (Honan); (2) Sinyang-Yencheng (Honan); (3) Yencheng to the southern bank of the Yellow River; (4) Shihkiachwang-Peiping (Hopei), and (5) the northern bank of the Yellow River to Shihkiachwang.

In addition to the purchase of 20 locomotives, the workshops at Hankow and Changsintien, southwest of Peiping, will be expanded and modernized in order to meet the increasing demands for facilities to repair damaged engines and the manufacture of minor equipment and accessories. Up-to-date devices will also be utilized to ensure greater efficiency and safety in traffic.

With regard to the improvement of its finances, special emphasis will be laid on the readjustment of old debts and repayment in regular instalments; increase of revenue, and establishment of an efficient budget system. It is understood that the total loan obligations of the Railway Administration exceed \$90,000,000.



# Japan and the Singapore Market

THE Japanese slogan "Advance in the South," implying a desire to secure economic mastery over the Philippines, the Dutch East Indies, Siam, and British Malaya, is being taken seriously by Japanese merchants in those territories, say the *Manchester Guardian*. Shipping, banking, exporting, and importing companies are going ahead with their plans and are capturing more markets from British and other foreign competitors. British merchants and bankers admit that, if the present developments continue, it will be only a matter of time before the trade of Singapore, the greatest entrepôt in the East and the center of a valuable British market, is completely dominated by the Japanese. The leading British newspaper in the colony, the *Straits Times*, which has hitherto supported the policy of maintaining Singapore as a free port, a tradition on which its entrepôt importance was built, has swung over to the support of the British merchants and is demanding Government action to "save Singapore for the British."

## Rubber for the United States

The success of the Japanese traders in Singapore is evidently due to the close co-operation which exists between their importers, exporters, shippers, bankers, and insurance companies. What has happened may be well illustrated by the conditions governing the shipment of rubber from Malaya to the United States. Freight rates are controlled by the Straits-New York Conference, of which all major shipping lines are members. Not all members, however, are traders as well as shippers. The Japanese, on the other hand, go farther even than that dual combination, and this makes it possible for them to buy rubber at as much as half a cent per pound (nearly 12s. 6d. per ton) above market prices in Singapore and to offer the rubber for sale in New York at rates below market prices by perfectly legitimate means. There is no violation of the shipping conference agreement, but the freight charge is merely a book entry as between carriers and traders, who are really one and the same organization, operating through two or three or more associated companies.

British shippers state that about 75 per cent of the rubber trade between British Malaya and New York is now in the hands of the Japanese, and the Japanese themselves admit that they have secured at least half of the trade. The general opinion is that within a year or so more than three-quarters of the rubber trade between the East and New York will be entirely transported in Japanese vessels, compared with approximately 10 per cent two years ago. A similar situation is developing in the shipping services between Singapore and British and European ports. Much of the rubber, tin, copra, and other commodities which leave British Malaya goes in Japanese ships, and the available space is not equal to the demand.

## Growth of Japanese Turnover

Not the least significant result of all this buying and shipping by the Japanese is an enormous concentration in the hands of Japanese traders of bills for sale, and naturally they submit their bills for discount through the Japanese banks established in Singapore. It is stated in authoritative quarters that the British banks have lost almost the whole of this business, and under the existing banking regulations in the colony the Japanese have the right to

demand, on an equality with British and all other recognized exchange banks, any amount from the Government, at the Government rate, in order to pay for the bills sold to them for the value of the commodities shipped. Up to a few years ago a local Japanese firm was satisfied at making an annual profit of Straits \$10,000 (about £1,200 sterling), but during the last financial year it made more than \$500,000 (about £60,000 sterling). The concern is not a large one, but a British company of approximately the same size which used to have an annual turnover of \$1,800,000 (about £210,000 sterling) has had its business curtailed by two-thirds. Japanese firms admit that they are doing good business to-day, and they fully expect to find discriminatory restrictions introduced at any time.

Trade statistics show that as a result of the textile quota scheme Lancashire's share of the piece goods trade of the colony has increased, but those figures do not directly reveal the way in which the restrictions have reacted on other markets. Japanese companies which were large importers of piece goods until the introduction of the quota scheme naturally secured the biggest quotas, and are to-day the most important dealers in Japanese textiles sold on the Singapore market. It is not too much to say that in one or two cases the quotas are a sufficiently big proportion of

the total permitted imports to give the firms concerned a virtual monopoly of the Japanese piece goods trade in Singapore. Those firms are making easy profits, thanks to safeguards provided by the British Government.

They are large importers also of other Japanese goods besides textiles. They are importing a great deal more cement, hardware, and porcelain than a year ago and selling at prices which undercut any figure the British importer can quote. They are importing huge quantities of hardware and manufactured goods in general and offering them for sale at a price which covers c.i.f. charges and local overheads, but does not include any margin for profit. This trade pays for itself, and, if it does not increase the firms' dividends, it does increase the total bulk of Japanese foreign trade and helps the industries, exporters, and shippers in Yokohama and Kobe. It is certain that "patriotic trading" on these cover-expenses, no-profit lines does exist, and it may form a much greater proportion of the total Japanese trade in the colony than many imagine.

## JAPAN WINS MARKET

JAPAN'S predominance in the Singapore market in the past four years is revealed in the trade statistics for British Malaya just published.

Its cement trade has risen by 19 per cent, iron sheets by 69 per cent, cotton goods by 36 per cent, matches by 56 per cent, while tin plate has gone up from nil to 15 per cent.

British exporters have failed to meet the competition.

Now they say that Japan will entirely dominate the market (states *British United Press*) and that the colony will be defended with British money to benefit only the Japanese.

## What Can Be Done?

The position is obviously serious for British companies. What remedies do they suggest? It is proposed that, as a start, the banking association in Singapore should not give full membership to foreign banks, which would then have to work under similar restrictions to those imposed on British banks in some foreign countries. Certain people, of course, are demanding a severe restriction by quota on Japanese imports of all kinds, and shipping quarters appear to favor any scheme calculated to give British shipping lines a bigger share in the total trade of Singapore.

What has emerged from recent discussions in the newspapers and clubs in Singapore is that the Japanese success is due entirely to methods of co-operation and co-ordination which are perfectly legal and which may be followed by British commercial interests if only they are willing to face the situation squarely. Although production costs in Japan and Great Britain are not a matter which can be controlled by the Singapore firms, there are many

(Continued on page 466)



# Mining Resources of China

IN a report written by Mr. T. F. Hou of the Geological Survey of China, covering the three years of 1932 to 1934, the general mining resources of the country are set forth in considerable detail. A summary of this report in English which has been issued is given as follows:

## Coal

**PROBABLE RESERVES.**—The latest estimate of the probable coal reserve of China was made by the Geological Survey of China in 1931. The total coal reserve is about 239,059 million tons in China proper and 4,610 million tons in Manchuria and Jehol.

**PRODUCTION.**—Various estimates have been made on the total production of coal in China. The total tonnage is as follows:—

	1932	1933	1934
China Proper ..	18,858,436	18,802,107	20,897,273
Manchuria ..	7,517,879	9,576,676	11,827,569
Total ..	26,376,315	28,378,783	32,724,842

It can be seen that the coal production of China proper (excluding Manchuria and Jehol) increased pretty regularly to 20 million tons in 1934, although the Kailan Coal Mine—the principal coal producer, has much decreased its production in the last few years. The depression of the grand total in 1932 is simply due to the bad condition in Manchuria.

The productions of the mines along the Tientsin-Pukow and Peiping-Hankow rail lines showed a gradual increase chiefly from the Liuhokou Co. (256,470 tons in 1930, 519,557 tons in 1933), Chinghsing Administration (472,758 in 1930, 706,081 in 1933), Mentoukou Co. (160,000 tons in 1930, 300,200 tons in 1933), Chung-hsing Co. (395,198 in 1930, 1,132,544 in 1933), Chungfu Administration (355,501 in 1930, 1,138,697 in 1933), Lieshan Co. (12,260 in 1930, 125,646 in 1933) and Tatung Co. (65,000 in 1930, 164,811 in 1933). The production of the Kailan Administration decreased by more than one million tons from 1930 to 1933. The Luta Co. of Shantung, Changhsing Co. of Chekiang and Hwatung Co. of Kiangsu all showed an advancing yearly output. The Hwainan Coal Mine of Anhwei and Chinpei Administration of Shansi are two new organizations with their productions of 217,701 and 241,604 tons in 1934 respectively.

There are four organizations, each of which had a yearly output exceeding one million tons, they are the Fushun Colliery of Liaoning, the Kailan Administration of Hopeh, the Chunghsing Co. of Shantung and the Chungfu Administration of Honan. 30 mines in China produce each over 100,000 tons a year, eight of which are in Manchuria, 18 in North China and four in Central China.

**COST OF PRODUCTION.**—The cost of production of coal, as obtained from 27 companies distributed over 11 provinces in North and Central China, varies from two to eight dollars per ton and averages at 4.719 dollars. As a rule it is lower in North China.

**MINING LABOR.**—A general record has been given by the Geological Survey of China. The total number of miners in China proper is estimated at 171,000 and in Manchuria at 96,000—a total of 267,000. This would give a daily output of 0.3 ton per man. The average daily wage per man is about 0.46 dollars. The annual production per capita of coal would be 118 tons.

**EXPORT, IMPORT AND CONSUMPTION.**—The export and import of coal in China during the last five years are given below:—

	1932	1933	1934
Export—China Proper ..	486,968	582,529	811,996
Manchuria ..	4,002,958	4,737,217	4,531,120
Import—China Proper ..	1,401,398	1,978,658	1,038,436

The consumption of coal in China is recently estimated by the author as follows:—

### COAL CONSUMPTION ACCORDING TO USES (IN TONS)

	China Proper	Manchuria
Railways ..	1,750,000	1,626,000
Mines and Metallurgical Plants ..	1,595,000	1,605,000
Steamers ..	1,100,000	
Household ..	10,500,000	3,178,000
Modern Manufacturing Plants ..	6,000,000	
Total ..	20,945,000	6,409,000

The average of coal consumption per caput is only 0.05 ton in China proper and 0.22 ton in Manchuria.

## Oil

**RESERVES.**—The oil reserves in China have been estimated by the United States Geological Survey at 1,375 million barrels, excluding the shale oil of Fushun and Shansi, which have been estimated at 2,110 and 852 million barrels respectively. The resources of oil in China proper and Manchuria, so far known, are thus 2,200 million barrels each, while those of Japan and Formosa were stated to be 1,235 million barrels.

Oil fields exist chiefly in Shensi, Kansu, Sinkiang and Szechuen. Oil has also been reported from several localities of Kweichow province. Oil shale occurs in Kwangtung, Jehol, Chahar, Shensi, Shansi and Szechuen. But it is only exploited at Fushun in Manchuria.

**PRODUCTION.**—Oil production of China is given in barrels as the following:—

	1932	1933	1934
China Proper ..	2,251	3,187	2,613
Manchuria ..	515,707	633,516	674,868

The only modern distillation plant in China is at Yenchang, North Shansi, with a daily production only 2 to 3 hundred cattles.

The Fushun oil-distillation plant was constructed in 1929 to 1930. It began to produce in 1931. The plant consists of 80 retorts, each having a capacity of distilling 50 tons of shale per 24 hours. The total production of heavy oil is about 60,000 tons a year, requiring 1,200,000 tons of oil-shale. The yearly production of crude oil is + 80,000 tons since 1933. The South Manchurian Railway Company is now spending Y.5,000,000 to enlarge the factory which was expected to double its producing capacity, up to 145,000 tons of crude oil per year, from April 1935.

Oil is also produced from coke ovens at Anshan, Penchihiu in Liaoning province (Manchuria) and at Shichiachuang in Hopeh province.

**IMPORT AND EXPORT.**—The importation of mineral oil into China, excluding Manchuria, is reported as 849,358, 1,152,284 and 877,280 tons respectively in 1932, 1933 and 1934. The shale oil of Fushun distillation plant is entirely shipped to Japan.

## Iron

**RESERVES.**—The iron ore resources of China as estimated by the Geological Survey are about 1,200 million tons, of which 883 million tons are in Manchuria. Of the remaining 323 million tons of ore, most are distributed in three main regions: (1) about 175 million tons in North China, (2) 112 million tons in Yangtze Valley and (3) about 36 million tons in the Southeastern Provinces.

**PRODUCTION.**—The iron ore production of China comes chiefly from Manchuria and the Yangtze Valley. The total figures in tonnage are listed below.

	1932	1933	1934
China Proper ..	797,599	726,823	950,000
Manchuria ..	1,041,613	1,176,643	1,185,031

Another 400,000 tons of iron ore were produced by native mines annually.

The production of pig iron, in tons, is as follows:—

	1932	1933	1934
China Proper ..	154,283	173,274	155,640
Manchuria ..	368,181	433,423	475,800

**EXPORT AND IMPORT.**—The iron ore exported chiefly comes from Yangtze Valley. It is reported as 550,946, 583,573 and 857,566 tons in 1932, 1933 and 1934 respectively and entirely shipped to Japan. Imports of manufactured iron and steel average about 600,000 tons a year.

## Manganese, Tungsten and Molybdenum

**MANGANESE ORE.**—This is chiefly produced from Kiangsi, Hunan, Kwangtung and Kwangsi, etc. The total reserve of



manganese ore has been estimated at 22 million tons with 45 per cent of manganese in average content. The production and exportation of manganese ore in recent years are as follows (in tons) :—

	1932	1933	1934
Production—China Proper ..	21,501	9,500	1,929
Manchuria ..	60	750	700
Export —China Proper ..	20,397	9,419	870

**TUNGSTEN ORE.**—This all comes from Kiangsi, Hunan, Kwangtung and Kwangsi. Kiangsi province is specially important as the first producer of tungsten ore in the world. The probable reserve of tungsten ore in Kiangsi is estimated at one million tons in total with 60 per cent of average mineral content. The quantity produced and exported from China in recent years, in tons, is as follows :—

	1931	1932	1933	1934
Production . . . . .	6,580	2,210	5,698	6,305
Export .. .. .	6,804	2,043	5,449	6,707

**MOLYBDENUM ORE.**—Molybdenum ore is produced from South Kiangsi and North Kwangtung in very small amount.

### Gold

The estimated gold production of China proper and Manchuria in three years is recorded as follows (in taels) :—

	1932	1933	1934
China Proper .. .. .	99,450	94,608	89,926
Manchuria .. .. .	6,434	17,811	38,500

### Silver

Silver is only produced from the lead smelting works of Changsha, Hunan province. The output of silver is reported as 150,945 taels for 1932, 200,585 taels for 1933 and 121,504 taels for 1934.

### Copper, Lead and Zinc

**COPPER.**—Kweichow and Szechuen produced very small amounts of copper in recent years. Yunnan is the main producing center of copper with about 400 tons annually.

**LEAD AND ZINC.**—Of the lead and zinc mines in China, Shui-koushan mine of Changning district in Hunan is the only important one. Minor production comes from Szechuen, Yunnan, Kweichow, etc. The total production in recent years is as follows :—

	1932	1933	1934
Zinc Ore .. .. .	10,584	10,565	13,299
Lead Ore .. .. .	5,576	5,320	6,670
Metallic Zinc .. .. .	57	147	136
Metallic Lead .. .. .	2,728	3,844	1,665

There are modern smelting plants of lead and of zinc at Changsha, Hunan. But the production of the zinc smelting plant seems to have deceased, only five months after its establishment in July, 1934.

### Antimony

The reserve of antimony metal in China is estimated at 3,677,000 tons, of which 90 per cent are distributed in Hunan province. The production of antimony in Hunan province keeps at a little over 10,000 tons annually in recent years and continues to lead the world, although it shows a depression as compared with 19,058 tons in 1925. Figures in tons are :—

	1932	1933	1934
Regulus .. .. .	11,410	11,112	13,615
Crude .. .. .	1,287	1,727	1,807
Oxide .. .. .	1,408	1,327	914

### Tin

The tin production of China comes chiefly from Yunnan province and a small amount from Kwangsi, Hunan, Kiangsi and Kwangtung. The total production of metallic tin in recent years is 7,253 tons for 1932, 8,358 tons for 1933 and 8,004 tons for 1934.

### Mercury, Bismuth and Arsenic

**MERCURY** is produced from Fenghuang district in Western Hunan and the Tungjin, Shengchi, Pachai districts of Kweichow. About only 1,000 pounds of mercury were annually produced from Kweichow in recent years.

**BISMUTH ORE** occurs in association with wolframite and is worked in Kiangsi, Kwangtung, Kwangsi and Hunan. The total production is about 20 tons in 1932, 45 tons in 1933 and 73 tons in 1934.

**ARSENIC OXIDE** is obtained by oxidizing the arsenopyrite which occurs in association with iron pyrite in Southern Hunan and Eastern Kwangsi. About 8 to 10 hundred tons are produced every year. There are also 4 to 5 hundred tons of realgar and orpiment exported annually from Yunnan province.

### Aluminium Minerals

Bauxite occurs in Shantung and Liaoning province with a probable reserve of 68 and 120 million tons respectively. Alunite is known in rich deposits in Chekiang and Anhwei with a total reserve of about 180 million tons. The bauxite in Manchuria-Liaoning province, is worked by Japanese while those of China proper still remain unexploited in field.

### Matsuoka Studies Manchu Minerals

President Yosuke Matsuoka of the South Manchuria Railway has instructed his subordinates to investigate mineral resources in Manchuria in preparation for carrying into effect an elaborate plan for their exploitation, according to *Domei*.

During his recent stay in Tokyo the railway man mentioned the scheme to Government authorities and got their consent to it. Then when he reached Dairen he accordingly issued the necessary instructions. Vice-Admiral Takuo Godo, president of the Showa Steel Works, and the authorities of the Kwangtung Government are to co-operate. Showa Steel, however, will not be directly interested in the mining end of the enterprise, which may be given into charge of a new special institution, formed for the purpose.

Acquisition of iron ore resources is considered exceedingly important for Japan, in view of the recent rapid development of its iron and steel industry. The Japan Iron Manufacturing Company has decided to spend more effort in getting such resources in foreign countries and for this purpose will send Mr. Matsuhei Takayama, now in charge of the mineral affairs, and other technicians to various South Sea countries. They are to leave Japan early this month.

The Japan Mining Company of the Nissan interests and Ishihar Industry Company have large iron mines in Malaya and are supplying ore to Japan Iron. The Japan Steel Tubing Company also has acquired mineral resources in the Malay Peninsula through a contract with the Sultan of Kelantan. The Japan Mining Company will mine in Australia by purchasing resources from a British owner.

Production of leading minerals in Japan Proper for 1935 has been announced by the Commerce and Industry Ministry as follows :

	1935	1935 value (Y.1,000)
Gold in grams .. .. .	18,293,869	56,234
Alluvial gold in grams .. .. .	27,447	75
Silver .. .. .	256,004,834	17,917
Copper in kilograms .. .. .	69,309,506	52,585
Tin in kilograms .. .. .	2,068,839	7,872
Lead in kilograms .. .. .	34,191,261	10,632
Pig iron in metric tons .. .. .	370,689	17,540
Alloyed iron in metric tons .. .. .	28,877	6,549
Steel in metric tons .. .. .	239,408	17,476
Sulphuric ferro ores in metric tons .. .. .	1,338,891	13,423
Coal on metric tons .. .. .	37,762,491	270,177
Crude oil in hectoliters .. .. .	3,509,568	11,985
Sulphur in metric tons .. .. .	164,945	10,244
Total including others .. .. .		504,419



# The Soviet Gold Industry

By A. YERMAN

**A** ROSENGOLZ, Soviet Commissar of Foreign Trade, reporting to the XII Congress of Soviets, stated: "The time has passed when we sought credits. At present we are receiving offers of longer credit, which we frequently reject, owing to the fact that we are seeking a radical improvement of credit terms."

The independence displayed by the Soviets in the field of finance is based on a number of factors. The growth of the gold production is one of them. In the last two years the Soviet gold industry made striking progress which, at first glance, appears unexpected. At the beginning of 1933 gold production lagged behind the Plan. At the beginning of 1934 the Soviet gold industry established for itself second place in the world, having produced more than America and Canada together.

This advance was secured by means of the effective measures and the thorough preliminary work carried out in the past three or four years.

The increase in output places the gold industry first among the foremost Soviet industries. Nevertheless, its present stage is considered as being only an initial one.

In Russia, gold mining had sprung up earlier than in the U.S.A., Africa or Australia. The first discovery of gold was made here in 1732, in the Archangel Government, near the village of Voitzki. In 1745 gold was discovered in the Urals, near Ekaterinburg (now Sverdlovsk). The low-grade Voitzki ore failed to develop the Archangel Government into an important center of gold mining, but the Urals became the cradle of the Russian gold industry.

The right to mine gold had been granted by the Government in 1887 on conditions, however, which rendered progress impossible and prevented rational organization of the gold industry. High taxation and inadequate mining laws forced the Russian gold miners to develop their work on the principle of "let us get ours while we can." Decline was the inevitable result. In 1882 the Russian gold industry held third place in the world for gold production and declining to fourth place towards 1909. When the World War broke out it was approaching fifth. In the period 1901-1914 the average annual output of gold approximated 43 tons. Of the total gold produced, placers yielded 85 per cent, out of which only 5.6 per cent was obtained by dredging and washing.

The World War, the revolution, the calamities of the civil war, with the ensuing disorganization of national economy, told heavily upon the Soviet gold industry. In 1917 gold production amounted to 26 tons and dwindled to two tons in 1921. In 1924 it reached 20 tons and for the next few years apparently kept on a low level. When the reconstruction of this branch was begun, 34 amalgamation mills, 11 cyanide plants, 24 dredgers, and 32 hydraulic installations constituted its technical foundation.

Success was gained through discarding the method of seasonal work, overcoming the question of fluctuation of labor power, abolishing rules hindering prospectors' work and organizing stores selling foodstuffs and industrial goods for gold. In the period prior to the revolution it had been considered inexpedient to arrange for gold mining in winter. The work was carried on only during the five warm months. For a long time this tradition prevailed, even after the revolution.

The low level of production, however, induced the Soviet Government to seek means to stimulate the output of gold. The prolongation of the period of gold mining served that purpose very well, but this took several years of preparation. It necessitated a new "technique" and also the creation of decent living conditions for workers. This proved to be one of the most difficult parts of the task. The "lure of gold," i.e., the privileges connected with gold mining, draw the people to the gold industry. The army of workers and prospectors rapidly increases. In 1933 it amounted to 700,000 men; in 1934 to 775,000. No wonder house construction failed to keep pace with the growth of labor power. Now, however, at a considerable number of mines the time-honored workers' barracks have given place to apartment houses. Together with the improvement in the State food supply service, the gold industry

organized a number of farms, which, in the course of the last two or three years, have developed into an additional important source of supply; 34,098 hectares sown in 1934 produced 36,214 tons of potatoes and 20,000 tons of vegetables. In addition, 1,026 tons of meat and 5,054 tons of milk were supplied by the cattle-breeding farms; 1,280 stores and several thousand small shops scattered throughout the gold-bearing regions sold goods for gold. These helped to improve the workers' supply, and also served as an incentive to them to increase the output of gold. Elementary and middle schools provided for the education of more than 100,000 children; 208 radio stations connected the centers of the gold mining industry with Moscow, the air service supplied them with newspapers, cinema films, etc. Apparently the results obtained made it possible to carry on gold mining in the winter. Anyway, the Decree to that effect was passed by the Soviet Government in August, 1933.

The improvement in the living conditions and the reorganization of the wage system on the basis of piecework also helped to prevent the fluctuation of labor power, which by 1930-31 assumed large proportions. At a large number of mines the staff of workers changed completely two or three times a year. However, better houses, bigger wages, and an improved food supply assisted two or three of the solutions of this problem. There is no doubt also that an important rôle was played by the Decree of 1932 exempting the population of the gold-bearing regions from taxation.

The Soviet authorities pay great attention to prospecting work and its development, both along the line of exploring the new areas and the working of the areas already explored. This was especially stressed in the Decree of 1933 in the words: "To secure the growth of the gold industry prospecting work is to be developed on a large scale throughout the gold-bearing areas. Rules hindering the free mining of gold are to be abolished."

The people of Siberia have for ages mined gold, and quite naturally a large number of highly experienced prospectors are to be found among them. Every available step has been taken to encourage them to remain in the industry. The prospector and his family are provided with their own individual house, with livestock, with better food. The discovery of a rich gold deposit entitles the prospector to a premium and he may work the deposit on condition that he delivers to the State a certain amount of gold. To instruct the prospector in his work and to afford him the necessary technical aid a network of geological exploring bureaux, headed by the Trust of Prospecting for Gold, have been organized throughout the gold-bearing regions. As a result, in the last two years the explored ore deposits increased fourfold, the explored placers three times. Nevertheless the work of the geological bureaux is considered not on a level with requirements. In order to stimulate it, the All-Union Contest for Prospectors has been declared.

The auriferous areas of the Union abound in small placers and mines. Their operation on a factory scale could not cover the necessary expenditure; yet to leave them undeveloped meant to leave in the ground a considerable amount of gold. The dilemma has been solved by the "prospector-gold miner," whose technical equipment, i.e., scrapers, small excavators, etc., is inexpensive and can easily be moved from one placer or mine to the other.

The "prospector-gold miner" is an independent worker. His income is determined by the amount of gold mined by him. Under a contract with the gold mining enterprise, the prospector (or the association of prospectors) is allotted a plot of gold-bearing area for working and is obliged to deliver a certain amount of gold to the enterprise. He is allowed to buy goods in the gold-buying stores with the gold delivered by him. The enterprise provides the prospector with a house, with communal and medical service, foodstuffs and industrial goods at the same prices and in the same way as the regular worker. It must instruct and supervise him and it may furnish him with the necessary technical equipment to carry out the mine development work for a certain remuneration in gold. The prospector is a member of the Trade Union of Workers of the Gold Industry, and his children enjoy the same privileges as the children



of workers. His income is not taxed and his farm is exempt from any kind of taxation.

Apparently the system works very well. In 1933 the army of registered prospectors amounted to 300,000 men. According to A. Serebrovsky, the Chairman of "Glavsoloto" (Chief Gold Trust), it is difficult to give their approximate number now. A large group of amateur prospectors, i.e., people for whom gold mining is an additional source of income, came into being. In fact, the Decree of 1933 granted the right to mine gold to the whole population of the gold-bearing regions. Men, women, workers and peasants rushed to mine gold when they could spare the time. The doors of the gold-buying stores with all their attractions have been opened to them.

The Soviet Union claims to hold first place in the world for natural resources of gold. The Conference of Gold Miners called in 1911 to discuss the prospects of the gold industry came to the conclusion that "in Russia the gold-bearing areas extend to more than a thousand versts in length and several hundred versts in breadth." The exploration work carried out in the last two years confirmed this apparently extravagant statement. The gold deposits of the Mountains in the Far East, the lode gold of Rifmanova Gora and Podlunni Goletz in Western Siberia, Kliuchi and Pilia in Transbaikalia, the ore deposits of Kazakstan and some other recently explored areas have increased the Soviet gold resources, and to no small degree.

The gold deposits of Kazakstan deserve special mention because an authoritative Soviet opinion asserts that, when developed, Kazakstan will have for the U.S.S.R. the same significance as the Transvaal has for Great Britain.

Gold mining experts state that the areas already explored are exceptional in the deposits of ore and the amount of gold present. The high-grade quartz zone of Djelambet in the East extends to several kilometers, and together with the Maikain mines located in its vicinity, suggests that in this part of Kazakstan gold can be obtained in large quantities. In the North a group of mines known as the "Stepniak" mines have already produced an impressive number of tons of gold and continue to increase the yield. The Djetigara gold deposits disclosed in the West are on the list with the mines to be developed in the earliest future. These deposits and a number of other gold-bearing districts reveal exceptional prospects for developing Kazakstan into an important center of gold mining.

It has officially been stated that the natural resources of gold in this country include deposits which need for their operation plants equal to Homestake in the U.S.A., or the Rand in Africa. By order of Orjonikidze (Commissar of Heavy Industry) the plans for working White Mountains, Podlunni Goletz, Kliuchi, Djelambet and Djetigara are being urgently developed.

The rapid development of the auriferous areas here is limited by two factors—by the scarcity of communications and the shortage of technical equipment. Although the machine-building industry fails to satisfy the growing demands, the present technical basis of the Soviet gold industry comprises nine golden cycle and 116 amalgamation mills, 57 cyanide plants, more than a hundred steam and electric dredgers, 190 hydraulic installations. Of the total gold produced now 70 per cent is obtained by machinery.

The transportation problem forced the Soviet gold experts to concentrate attention on lode gold. The districts where there are lode gold deposits are already connected either with the industrial centers or with the railway.

The following mines serve as main sources of Soviet gold: the Blagodatkino mines in Bashkiria; Berezovsk and Kachkar in the Urals; Aidirla mines in the Volga region; the Minussinsk mines and Podlunni Goletz in Western Siberia; the Zmeinogorsk mines in the Altai; Djelambet; Djetigara; Maikain and Stepniak in Kazakstan; Balei; Darasun; Kliuchi and Dmitrovski mines in Transbaikalia; the White Mountains and Visochaishi Goletz in the Far East, and some others.

In 1934 the Soviet gold industry surpassed that of America in production but not in efficiency. The general organization of labor, the utilization of equipment and working time, the methods and conditions of work were not on a level with the American industry. According to A. Serebrovsky, a large number of plants could easily increase their capacity by 40-60 per cent by the sole means of improving the organization of labor.

The solution of the efficiency problem has been found in the progressive-premium wage system, introduced in 1934. It sets the cutting down of cost of production as a salary criterion. Each per cent of decrease in the cost of production increases the salary by

10 per cent, each per cent increase in cost of production decreases the salary by 10 per cent. The workers' wages depend on the number of cubic meters of ore mined and on the amount of gold present in the mined ore. When the plan is exceeded, a premium is awarded and the worker is entitled to buy goods in the gold-buying stores.

\* \* \*

Supplementing the foregoing, the following condensed from an article by John F. Chapman in "To-day" is of interest:

Stalin recently declared that by 1937 the Soviet Union is going to be the world's biggest gold miner. If Stalin can keep his promise, Russia will return to her former rank as a "power."

Czarist Russia was always a leading gold-producing country. In 1915 her reserves amounted to more than \$830,000,000. With the Revolution this gold disappeared; mining was abandoned; and in 1922 Bolshevik officials timidly claimed to have \$2,607,000 in gold. Little Latvia had almost that much. Now, the last statement of the Soviet State Bank shows that Russia once more has a gold store worth nearly \$800,000,000. Only the Treasuries of the United States, France and England hold more gold.

Seven years ago Stalin decided that Russia needed gold in a hurry. He sent one of his leading engineers to the United States to see how gold was mined, and to Alaska where men work under weather conditions similar to those in the newly discovered gold fields in Siberia—claimed to be the biggest in the world.

In 1928, new Soviet gold was worth \$31,000,000. In 1933 it was \$93,000,000. In 1934 it was \$150,000,000—surpassing the gold production of the United States or Canada, and led only by South Africa. Stalin assumes that the 1934 50 per cent gain can be repeated for the next three years. This would mean that the miners could push their diggings to \$500,000,000 in 1937. South African production has held steadily around \$400,000,000 for several years.

To help them, the Soviets will have a lot of new mining machinery—some made at home, some bought in England and the United States. But more important is the new method of getting Russians interested in prospecting. Since they can't stake claims for themselves in the Soviet system, Stalin played up the pioneer feature—new frontiers and a home provided by the government, with a lot of little luxuries not yet permitted to the general public. Youngsters fell for the plan.

By the end of 1934, half a million Russians were grubbing for gold. Moscow blared all sorts of encouragement to them through loud speakers. They became heroes when Stalin personally commended them to the whole nation for producing as much gold as the Plan specified.

Engineers who have visited the mines say that Russia's dream of being the world's largest gold miner is not exaggerated. What is it all going to mean to Russia and to the rest of the world? It will help at home. The first Five-Year Plan was a gruelling experience to most Russians. They didn't have enough to eat or wear. When the second Plan was announced, Moscow promised that life would be made easier. That is why bread is no longer rationed, shoes are more plentiful, and blocks of new apartments have been built in the most crowded cities. When Moscow has \$400,000,000 or \$500,000,000 in new gold each year, it will be possible to provide more things for more of the people.

To the United States it will mean increased sales to Russia. Late in 1934 a boat loaded with Russian gold ore arrived at Tacoma. It was sold for refining and brought \$400,000. Since then other loads have come over, the gold from which has been spent for American goods. Russian gold imports in a month jumped to \$3,000,000.

Here, however, is the really significant point in Russia's new rôle. If the Soviets live up to their gold program, Moscow is going to become more important in the world's diplomatic council chambers and markets. In the past, Russia has paid excessive prices for foreign purchases, and exorbitant interest rates on the small credits which they could secure—all because the world insisted they were bad risks. Politically they were little better off.

This attitude is changing. Paris, badly frightened by Hitler's rearming, has agreed to talk business in return for Soviet military co-operation "in an emergency." With a sudden display of cordiality, the League of Nations invited Moscow to join. Litvinov made his triumphal tour of Europe and returned with a sheaf of

(Continued on page 466)



# The Manchoukuo State Railways

## PART I

**W**HEN Manchuria declared its independence from China on March 1, 1932 and established the New State of Manchoukuo there was a problem, among other things, of how the State Railways should be administered. Railways cannot be operated by common sense of inexperienced men and Manchoukuo being still in her infancy lacked this primary faculty. However, the South Manchuria Railway Co., having an experience of more than 25 years in the successful operation of railways in Manchuria, was available to undertake this gigantic task. The Company with its long established goodwill and credit was, moreover, in a position to command the capital necessary for the improvement of the existing railways and building of new railway net into the virgin country.

In view of this fact the important mission of operating all of the Manchoukuo State Railways and construction of all new railways were entrusted to the South Manchuria Railway Co. under the contract signed on February 9, 1933, the gist of which is given below. And the South Manchuria Railway, in order to satisfactorily fulfil the trust placed upon it, established a bureau called the General Direction of the State Railways at Mukden, which was opened on March 1, 1933, to manage and operate the State Railways.

### Gist of Contract between the Manchoukuo Government and the South Manchuria Railway Co.

(1) The Manchoukuo Government has recently approached the South Manchuria Railway Company with a proposition to entrust the Company with the administration of the various railways owned by the said Government. To secure peace and order in Manchoukuo and to foster industries, the development and improvement of facilities of communications, especially railways, are of primary importance. The matter, as it stands to-day, however, leaves much to be desired in that the network of railways is not yet fully spread over, while the minor local railways are operated in such an independent manner as would be disadvantageous to one another's interests. It is absolutely necessary at this time, therefore, that the existent railways should be unified and placed under the rational and systematic management to secure the maximum efficiency, both economic and technical. For this undertaking of railway management, it may well be said that the South Manchuria Railway Company is best qualified with the warrant of its long experience in the running of railways in Manchuria. Besides, the arrangement will be found convenient by both parties in settling the enormous amount of liabilities relative to railways, the claims of which the South Manchuria Railway Company has on the Manchoukuo Government. Such being the case, the South Manchuria Railway Company sees no reason to object to the proposition and has accordingly accepted it with pleasure.

(2) The provisions of the contract may be summarized as follows:

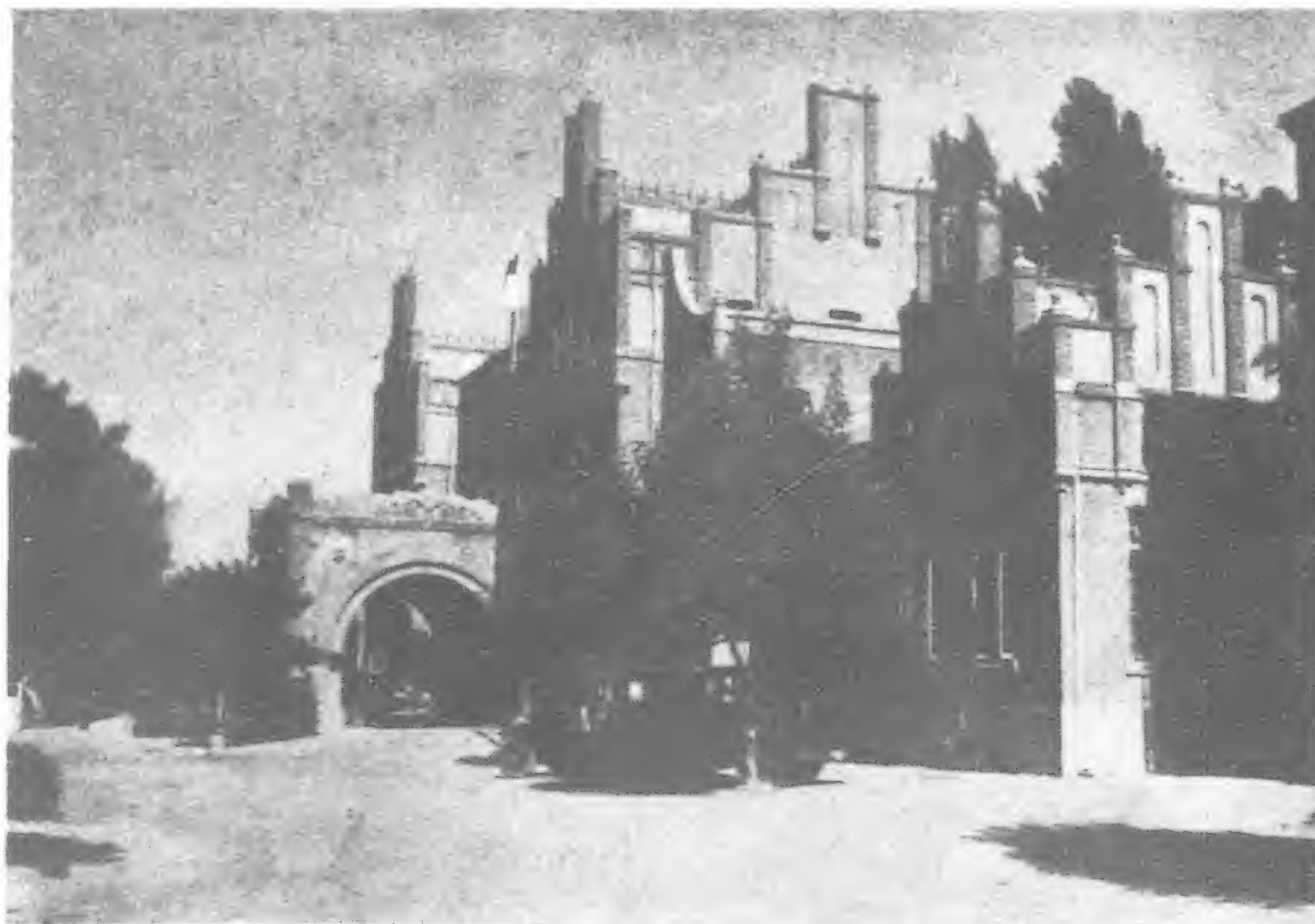
The loans and other liabilities totalling about Y.136,000,000 which Manchoukuo is under an obligation to repay to, or has incurred in favor of the South Manchuria Railway Company in connection with her existing railways, viz.: Kirin-Changchun, Kirin-Tunhua,

Kirin-Hailung, Ssuping-kai-Taonan, Taonan-Angangchi, Taonan-Suolun, Tsitsihar-Koshan, Hulan-Hailun (including a part of the enterprise of water transportation on the River Sungari), Mukden-Hailung, and Mukden-Shanhaikwan (including the Tahushan-Tungliao Line and its attendant ports) railways, are merged together and converted into a loan under the contract; all the properties and revenues of these railways are to constitute the security for the loan, and the management of these railways is entrusted to the S.M.R. Co.

All claims and debts existing between the Manchoukuo Government and any third party concerning any of the above-mentioned railways will be settled by the Company after consultation with the Manchoukuo Government. The amount of payment found necessary and funds for the redemption of the loans which the Mukden-Shanhaikwan Railway is under an obligation to repay to the British and Chinese Corporation shall be paid out of the revenues to be derived from the operation of these railways. That portion of the Mukden-Shanhaikwan Railway which is related to the loans made by the British and Chinese Corporation is to be excluded from the security of the present contract until the pending question concerning the loans shall have been settled.

The Manchoukuo Government concludes with the South Manchuria Railway Company a separate contract for the construction of railways between Tunhua and the River Tumen, between Lafa and Harbin, and between Taitung and Hailun (including the Ning-nien-Noho line), respectively.

The cost of the construction is to amount to the total amount of about Y.100,000,000.



Office of the General Direction of the Manchoukuo State Railways at Mukden

As it will be necessary for Manchoukuo, in connection with the construction of the Tunhua-Tumen River Railway, to purchase the Tunhua-Tumen River Light Railway, Manchoukuo borrows from the South Manchuria Railway Company about Y.6,000,000 as the capital for the purchase, and entrust the management of the Light Railway to the Company.

### Problems of the Railways

When the General Direction took over the lines, they were in a state of disrepair and questionable management. The roads were poorly ballasted, ties were decaying, rolling stock needed wholesale repairs, passenger coaches

unclean, dining car service unsatisfactory. Such conditions were mainly brought about by the unscrupulous exploitation of Mukden War-lords who looked upon the railways as their own private source of revenue, as generally practiced in China. They had been compelling the railway administrations to pay from their revenues military and political expenditures. It even sometimes happened, therefore, that the employees had to go unpaid for months and wages were reduced by half. Taking of bribes in purchasing railway supplies was an every day affair. As for the management, the lines were operated independently of each other, at times occasioning competing among themselves. In other words conception of rational and economical management was totally lacking.

The natural consequence of this state of affairs were the difficulties in the way of continuing operation. The Railway revenues which had shown a rising trend up to 1926 commenced to drop and during the years from 1927 to 1929, when anti-Japanese





The Modern City of Mukden where the General Direction of the State Railways is located

activities were at their height, turned for the worse. And in the hectic period of cut-throat competition against the South Manchuria Railway, after 1930, their difficulties almost reached a crisis.

The following data from the representative lines, branching off to the east and west of the Nipponese-owned South Manchuria Railway, describe in part the conditions on the railways:

Year	Ssuningkai-Taonan Rly.			Kirin-Changchun Rly.		
	Revenue	Expenditure	Balance	Revenue	Expenditure	Balance
1925 ..	5,380	4,934	446	2,723	2,361	362
1926 ..	9,171	8,196	975	3,039	2,845	194
1927 ..	6,795	7,650	- 855	3,332	3,110	222
1928 ..	6,290	6,975	- 685	3,656	3,191	465
1929 ..	6,930	7,758	- 828	3,915	3,431	484
1930 ..	7,477	12,001	- 4,524	3,066	3,645	- 579
1931 ..	8,235	13,400	- 5,165	2,913	3,351	- 438

(000 omitted)

NOTE:—*Ssuningkai-Taonan Railway.* The sudden drop of figures from 1930 is influenced in part by the drop in silver exchange rate.

*Kirin-Changchun Railway.* The figures for 1931 show figures up to the end of October it being amalgamated with the Kirin-Tunhua Railway in November.

Consequently, it was impossible to repair and replenish rolling stock or to maintain tracks in good condition. Thus, no thought was given to the disintegration of the railways nor was it possible to look back to the basic factors, such as the necessity of reorganizing their system of management and training and education of employees. Ultimately this caused the men to forget their loyalty to the railways, and then the interests of the public and shippers were neglected.

### Since March 1, 1933

Since the General Direction took charge of the railways it has been working tirelessly to realize the fruit of unified management of all the railways under one administration. It has set to work on the following major matters and enterprises:—

- (1) Establishment of uniform passenger and goods traffic regulations, fares, rates and classification on all of the railways.
- (2) Running of through trains between the adjacent railways.

Special mention must here be made concerning the through running of trains between the Mukden-Shanhaikwan and Peiping-Shanhaikwan lines. The through operation

of trains between Mukden had been interrupted since the "Incident" but after a series of difficult negotiations with the Chinese Railway authority, through trains are now running since July 1, 1934, and the passengers are enjoying non-change trip between Mukden and Peiping.

- (3) Operation of sleeping and dining cars.
- (4) Inauguration of through booking passenger and goods traffic with the adjacent railways.

Not to mention the arrangement entered into between the South Manchuria Railway, North Chosen Railway, Chosen Government Railways, Japanese Government Railways and various steamship companies for shipment of goods under a single bill of lading, the arrangement which was concluded on March 6, 1936, and commenced operation since May 1, 1936, is most significant in that it serves as sufficient evidence for resumption of normal relations between Manchoukuo and North China which had been considerably strained since the "Incident."

The agreement was concluded among the South Manchuria Railway Co., the General Direction and the Peiping-Shanhaikwan Railway Bureau and is composed of the Agreement with thirteen articles and Goods Through Traffic Regulations of thirty-one articles.

A few of the important provisions are as follows:—

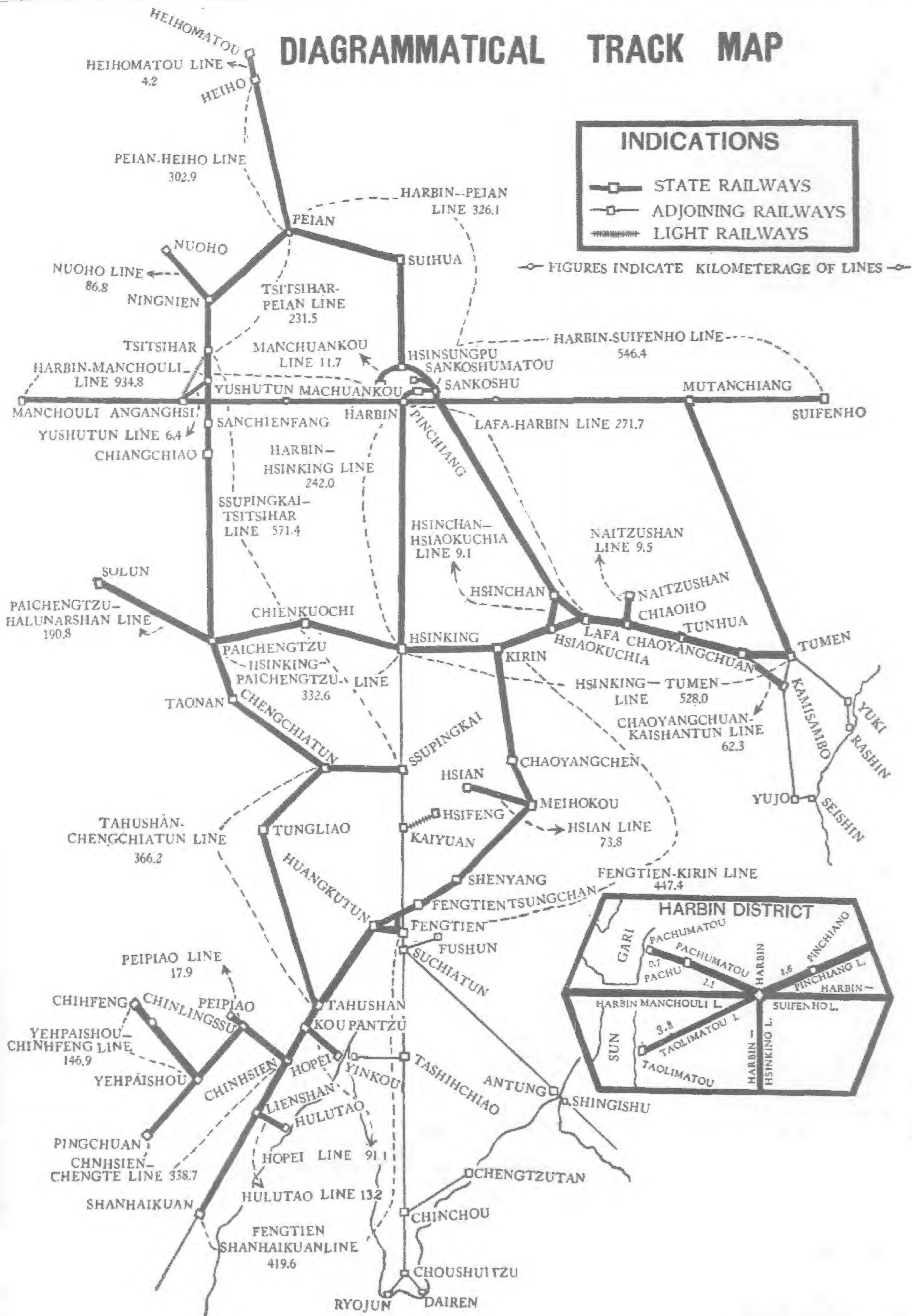
- (1) Custom procedure (payment of duties advanced, if any) is to be done by the dispatching railway at Shanhaikwan without cost to the shippers.
- (2) Transshipment shall be made by the railways concerned at their own responsibility at Shanhaikwan.
- (3) Transportation to be done at railway risk with certain exceptions on the Peiping-Shanhaikwan line.
- (4) The local rates of the respective railway are to be applied.
- (5) Freight for dispatching railway to be prepaid and for destination railway to be paid at destination.
- (5) Establishment of mixed-storage system.
- (6) Operation of bus lines as feeders to railways.
- (7) Development of river navigation.
- (8) Improvement and repairing of tracks, road bed, bridges, etc.
- (9) Replenishment and repairing of rolling stock.
- (10) Improvement of train operation.



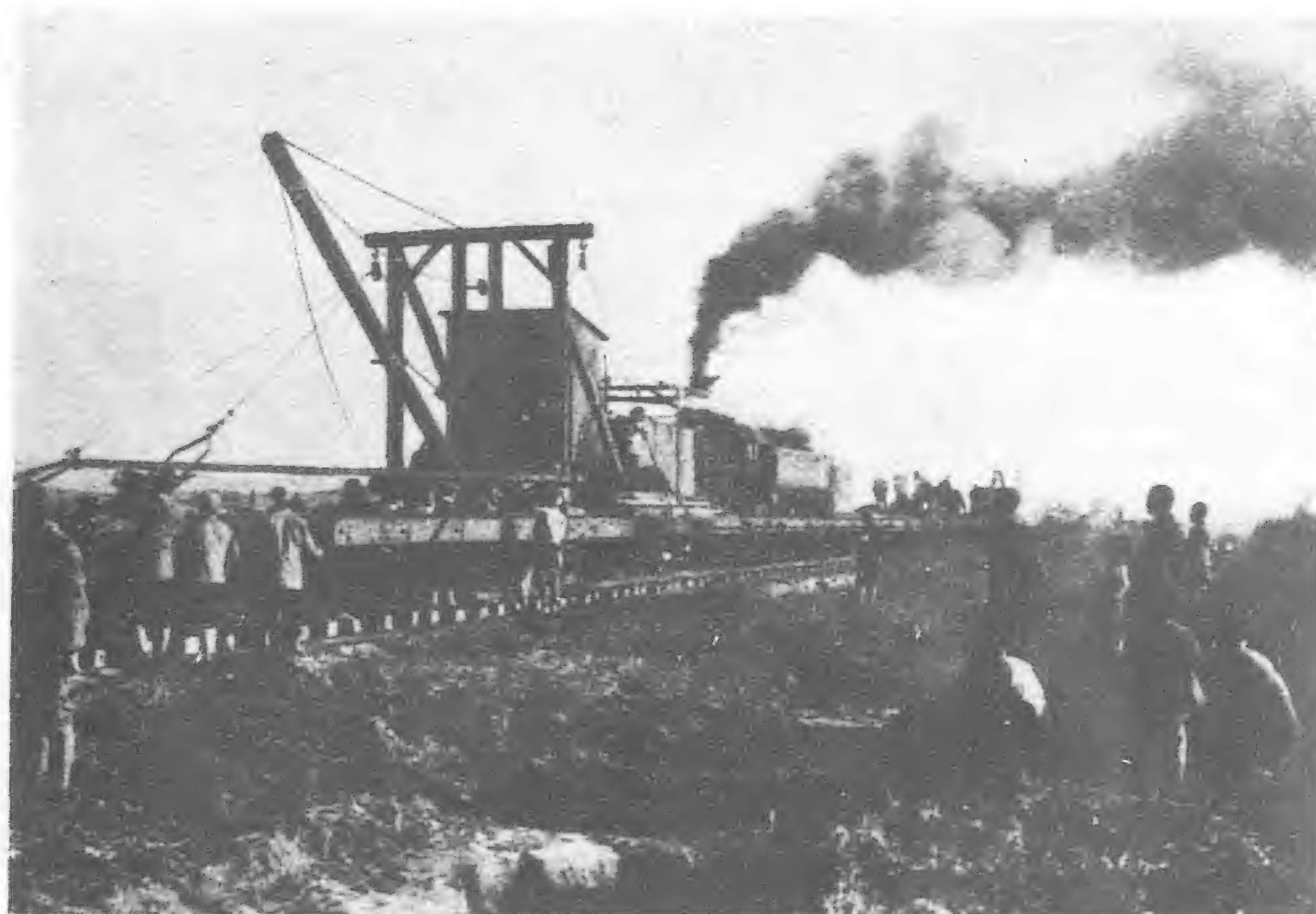
Interior view of the Observation Car of the Mukden-Peiping Through Train



# DIAGRAMMATICAL TRACK MAP







Rail laying machine at work in Manchuria

- (11) Establishment of rational system of employees' compensation.
- (12) Unification of schools under the General Direction that were formerly managed by respective railways.
- (13) Establishment of Railway Training Institute.
- (14) Unification of hospitals under the General Direction that were formerly managed by respective railways and opening of these hospitals to the public.
- (15) Operation of hotels at important points.
- (16) Assurance of railway safety by guard system of their own.
- (17) Development of industries along the railways in co-operation with the people.
- (18) Establishment of up-to-date system of railway accounts, purchasing and statistics.

Thus, it may be observed that the General Direction has become not merely a railway institution, but also one of the primary civilizing and developing forces with tremendous task and responsibility ahead.

### Lines Managed by the General Direction

The following railways are now managed by the General Direction :—

(Kilometerage, fraction being disregarded)

Manchoukuo State Railways . . . 7,513 km.

Managed and operated by the General Direction

#### A. Standard Gauge Lines

1. Mukden-Shanhaikwan . . .	419 km.
2. Mukden-Kirin . . .	447
3. Hsinking-Tumen . . .	528
4. Lafa-Harbin . . .	272
5. Harbin (Sankoshu)-Peian . .	326
6. Tsitsihar-Peian . . .	230
7. Ssuping kai-Tsitsihar . . .	571
8. Tahushan-Chengchiatun . .	367
9. Chihhsien-Chengte . . .	435
10. Chinlingssu-Peipiao . . .	17
11. Yehpaishou-Chifeng . . .	148
12. Kowpangtzu-Hopei . . .	91
13. Lienshan-Hulutao . . .	11
14. Shaho-Ssuping kai . . .	156
15. Naitzushan-Chiaoho . . .	9
16. Chaoyangchuan-Kaishantun .	60
17. Tumen-Mutanchiang . . .	248
18. Mutanchiang-Poli . . .	196
19. Hsinchan-Hsiaokuchia . . .	9
20. Machuankow-Hsinsungpu . .	11
21. Sankoshu Bund Line . . .	3
22. Peian-Heiho . . .	303

23. Ningnien-Noho . . .	86 km.
24. Yushutun-Angangchi East . .	5
25. Paichengtzu-Nanhsingan . .	319
26. Hsinking-Paichengtzu . . .	332
27. Linkow-Mishan . . .	183
28. Hsinking-Harbin (formerly part of the C.E.R.) . . .	242

Sub-total . . . 6,024

#### B. Broad Gauge Lines (Formerly North Manchuria Railway)

29. Harbin-Manchouli . . .	934
30. Harbin-Suifenhö . . .	546
31. Harbin-Pinchiang . . .	2
32. Pristan Bund . . .	4
33. No. 8 District Bund . . .	3

Sub-total . . . 1,489

Grand total . . . 7,513 km.

### Chinese Eastern Railway

The Chinese Eastern Railway (called the North Manchuria Railway after the " Incident ") which to Manchoukuo had been like a " pebble in the shoe " was finally transferred by Soviet Russia to Manchoukuo on March 23, 1935, after

negotiations that lasted for nearly two years. And simultaneously the whole railway and its supplementary enterprises were entrusted to the General Direction for management.

As could be understood from the preceding paragraphs the Manchoukuo Railways were actually amalgamated into one body as State Railways when they were placed under the management of the General Direction. However, the Chinese Eastern Railway had been outside of this unification and for this reason it was difficult to expect complete success of this unified management. But with the placing of the railway under the management of the General Direction complete amalgamation for unified management has at last been attained.

On the very date of the actual transfer the General Direction enforced the following major revisions on the Chinese Eastern Railway system :—

1. The name of the railway was changed as follows :—Section between Harbin and Manchouli to be called Harbin-Manchouli line, between Harbin and Suifenhö (Pogranichnaya) to be Harbin-Suifenhö line and between Harbin and Hsinking to be Hsinking-Harbin line.

2. The imaginary and irrational gold rouble standard was replaced by Manchoukuo Yuan.



A train of busses operated by the General Direction of the Manchoukuo State Railways



3. Although this revision alone at once amounted to considerable reduction in the rates, the rates themselves were also reduced to the standard rates of the State Railways; loss attributable to this action is expected to be about five to six million yuan per annum.

Some idea of the reduction may be had by the following examples.

#### EXAMPLES FOR FREIGHT RATES

(per metric ton in Manchoukuo Yuan)

Articles	Consignment	Old rates	New rates	New rates are cheaper by
Cotton piece goods	less-than-car-load	57.94	13.86	44.08
	car-load	not handled	11.15	46.79
Fresh fish	less-than-car-load	57.94	11.45	46.49
	car-load	not handled	8.74	49.20
Iron	less-than-car-load	42.93	11.45	31.48
	car-load	not handled	8.74	34.19
Manufactures	less-than-car-load	21.78	11.45	10.33
	car-load	14.59	8.74	5.85

NOTE.—The old rates, having been in gold rouble standard, were converted into Manchoukuo Yuan at MY.137 per 100 gold roubles for sake of convenience.

#### EXAMPLE FOR PASSENGER RATES

Classes	Old per km.	New per km.	(MY) Amount reduced per km.
1st class	.075	.05	0.25
2nd class	.038	.03	.008
3rd class	.025	.02	.005

Note:—For the old rates approximate figures converted into MY are shown, because in the old system rates were given by district and not per unit of distance.

4. Seat charges were abolished.

Formerly passengers were required to purchase seat tickets regardless of night or day train besides the regular train fare. They amounted to G.R. 6.00 for 1st, G.R. 4.00 for 2nd and G.R. 1.00 for third class. Abolition of this system means big savings to the passengers.

### Change of Gauge Hsinking-Harbin

Another important matter which must not be passed unnoticed is the re-laying of broad gauge (5 feet) section between Hsinking and Harbin, a distance of 240 kms., to standard gauge (4-ft. 8½ in.).

From the standpoint of railway transportation it is quite unnatural and inconvenient to cut a straight line at a point half way as was the case from Dairen to Harbin which was standard gauge from Dairen to Hsinking and broad gauge from there to Harbin. The traffic between these two points (Dairen and Harbin) had, therefore, been greatly impaired due to necessity of changing trains at Hsinking. In view of this fact the General Direction commenced preparation for re-laying of the said section immediately after having been entrusted with its operation, and with the participation of about 2,000 trained workers and expert supervisors successfully carried out the project within two hours 50 minutes on the morning of August 31, 1935, without the slightest interruption of traffic.

The event was the first of its kind in the annals of railway history in this part of the Orient not only because of the speed with which the

change was effected, but also because it taxed the men to their utmost efficiency and skill.

The change brought about smoother and quicker traffic between South and North Manchuria. For instance the limited express train "Asia" of the S.M.R. is now running between Dairen and Harbin in 13 hours and 30 minutes while formerly 18 hours and 30 minutes were required by the trains that had the best connection. This means a saving of five hours. And with respect to goods traffic, the elimination of transshipment at Hsinking and the time saved affords immeasurable benefit to the shippers and general public by lessening of damages due to transshipment and transporting of perishable goods, such as, fish, fruits, etc., more rapidly for the consumption of people in the North who are remote from such amenities of life. Thus, it could be easily imagined the extent to which the consummation of this project is contributing to the development of social, economic and industrial life of the new State, locally as well as with Japan by providing closer and quicker connection through Dairen, Antung or Tumen.

### Construction of New Lines

Reference should be made here to the construction of new railways in Manchoukuo. More railways being much in demand in a country of the size of Manchoukuo, the Government also entrusted the building of new railways to the South Manchuria Railway Co. under a contract signed on the same day as of the contract for the entrusting of operation mentioned before. The South Manchuria Railway, then established the Bureau of Railway Construction in Dairen to undertake this work.

The Bureau has made tremendous stride and has already built nearly 3,000 kilometers of standard gauge lines as shown in the following table:—

#### Lines constructed after the Incident.

1. Peian-Heiho Line	303 km.
2. bet. Taian and Peian of the Tsitsihar-Peian Line	102
3. bet. Peian and Hailun of the Harbin-Peian Line	106
4. bet. Tunhua and Tumen of the Hsinking-Tumen Line	189
5. bet. Laha and Noho of the Ningnien-Noho Line	38
6. Lafa-Pinchiang (Harbin) Line	272
7. Sankoshu Bund Line	3
8. Hsiaokuchia-Hsinchan Line	9
9. Chaoyangchuan-Kaishantun Line	60
10. Tumen-Mutanchiang	248
11. Hsinking-Paichengtzu	332



Tunhua which has become an important railway terminal since completion of the Kirin-Tunhua Railway Line



12. Chinh sien-Chengte .. .. .	435 km.
13. bet. Wangyehmiao and Nanhsgan (Pai-chengtzu-Halunarshan Line) .. .. .	237
14. Yehpaishou-Chihfeng .. .. .	148
15. Linkow-Mishan .. .. .	183
16. Mutanchiang-Poli .. .. .	196
17. Hsian-Ssuping kai .. .. .	82
Total .. .. .	2,943

The Lines that are now under construction or projected are :

1. bet. Nanhsgan and Halunarshan .. .. .	22
2. Poli and Chiamussu .. .. .	135
3. Hsinlitun and Hsinchiu .. .. .	63
4. Hsinchiu and Ihsien .. .. .	68

5. Meiho and Tunghua .. .. .	150 km.
6. Tunghua and Tsian .. .. .	90
7. Tapingchuan and Lupei .. .. .	174
8. Noho and Nonchiang .. .. .	91
9. Mishan and Hulin .. .. .	165
Total .. .. .	958

And these railways when completed are to be managed by the General Direction.

The preceding tables give the railway revenues and expenditures for 1932, 1933, estimate for 1934, actual figures for 1934, and estimate for 1935.

Although absolutely accurate comparison of conditions before and after the inauguration of the General Direction cannot be expected by comparing the figures for 1932 and 1933, because the latter figures are the result of accounting system newly employed by the General Direction in conformity with the new organization, it is hoped that they will serve to give the reader at least a general idea.

The revenue for 1933 exceeds that of 1932, by 3,778,967.60 which eloquently speaks for itself. But the expenditure for 1933 exceeds that of 1932 by MY.5,273,799.57. This is because in 1933 initial expenses that were necessary for the establishment of the General Direction, in the employment of many new experts, preparatory and running expenses for new office buildings, new installations, etc., had to be accounted for. Consequently, had it not been for this fact, the balance for 1933 would have exceeded the 1932 balance by about MY.3,773,000.00 for according to the figures given the balance for 1932 exceeds the 1933 balance by about MY.1,500,000.00.

As for 1934, it was estimated that the revenue would amount to MY.71,223,592.00, but the actual revenue obtained amounted to MY.72,024,805.92, the difference being only 801,213.92. In other words, the revenue was very closely estimated. In the case of expenditure, however, the estimated figure is MY50,085,591.00 and the actual figure is 55,832,922.64, the excess of the latter over the former being MY.5,747,331.64. This difference is due to two primary



Street scene in Yanki, political center of the border Province of Chientao, formerly a center of anti-Japanese activities, now an orderly thriving center with a population of 25,000

# RAILWAYS EARNINGS

	1932		1933		(in Manchoukuo Yuan or MY.) 1934 (Estimate)	
	R	E	R	E	R	E
General Direction .. .. .	1,513.14	173,231.63	7,184.27	5,345,249.35	705,311	6,551,057
Kirin-Changchun and Tunhua Rly. .. .. .	6,171,166.93	4,216,336.04	8,855,219.49	6,214,841.50	10,399,965	5,397,834
Kirin-Hailung Rly. .. .. .	715,601.23	1,131,336.05	957,867.13	1,394,572.35	1,272,572	1,618,846
Ssuping kai-Taonan Rly. .. .. .	13,846,823.75	6,021,761.47	10,953,297.89	5,163,042.34	13,038,938	5,177,119
Taonan-Angangchi Rly. .. .. .	5,605,989.68	4,159,008.58	4,991,674.25	3,003,314.19	5,636,059	2,645,175
Tsitsihar-Koshan Rly. .. .. .	3,492,618.08	3,649,167.12	3,869,396.86	3,253,990.92	3,310,666	3,473,991
Taonan-Suolun Rly. .. .. .	50,212.21	202,745.31	101,267.18	215,818.94	154,277	407,273
Mukden-Hailung Rly. .. .. .	7,156,535.98	5,779,239.47	6,668,872.71	5,711,450.59	7,439,460	4,879,237
Hulan-Hailun Rly. .. .. .	2,962,367.20	4,615,194.90	3,475,719.44	3,972,891.98	4,741,538	3,303,122
Mukden-Shanhaikwan Rly. .. .. .	10,252,238.64	8,461,912.60	14,123,535.22	9,408,551.58	15,612,316	10,125,315
Tunhua-Tumen Rly. .. .. .	—	—	—	—	2,849,390	1,810,799
Chaoyangchuan-Kaishantun Rly. .. .. .	—	—	—	—	495,420	631,495
Lafa-Harbin Rly. .. .. .	—	—	—	—	5,057,830	2,109,206
Hailun-Koshan Rly. .. .. .	—	—	—	—	479,850	1,653,594
Noho line .. .. .	—	—	—	—	30,000	301,608
Total .. .. .	50,225,066.84	38,409,933.17	54,044,034.44	43,683,723.74	71,223,592	50,085,591
Balance .. .. .	—	11,845,133.67	—	10,320,310.70	—	21,138,001

	1934		1935 (Estimate)	
	R	E	R	E
General Direction .. .. .	822,893.71	6,765,708.48	2,909,565	6,209,393
Mukden Direction .. .. .	21,766,654.21	14,954,891.89	24,013,117	15,478,485
Hsinking Direction .. .. .	14,562,877.71	12,252,571.35	17,726,631	11,577,072
Harbin Direction .. .. .	13,366,359.70	9,542,256.48	10,950,716	9,682,684
Taonan Direction .. .. .	21,506,020.59	12,317,494.44	20,821,964	10,892,147
Total .. .. .	72,024,805.92	55,832,922.64	76,421,993	53,839,781
Balance .. .. .	—	16,191,883.28	—	22,582,212

(Figures for the former Chinese Eastern Railway not included)



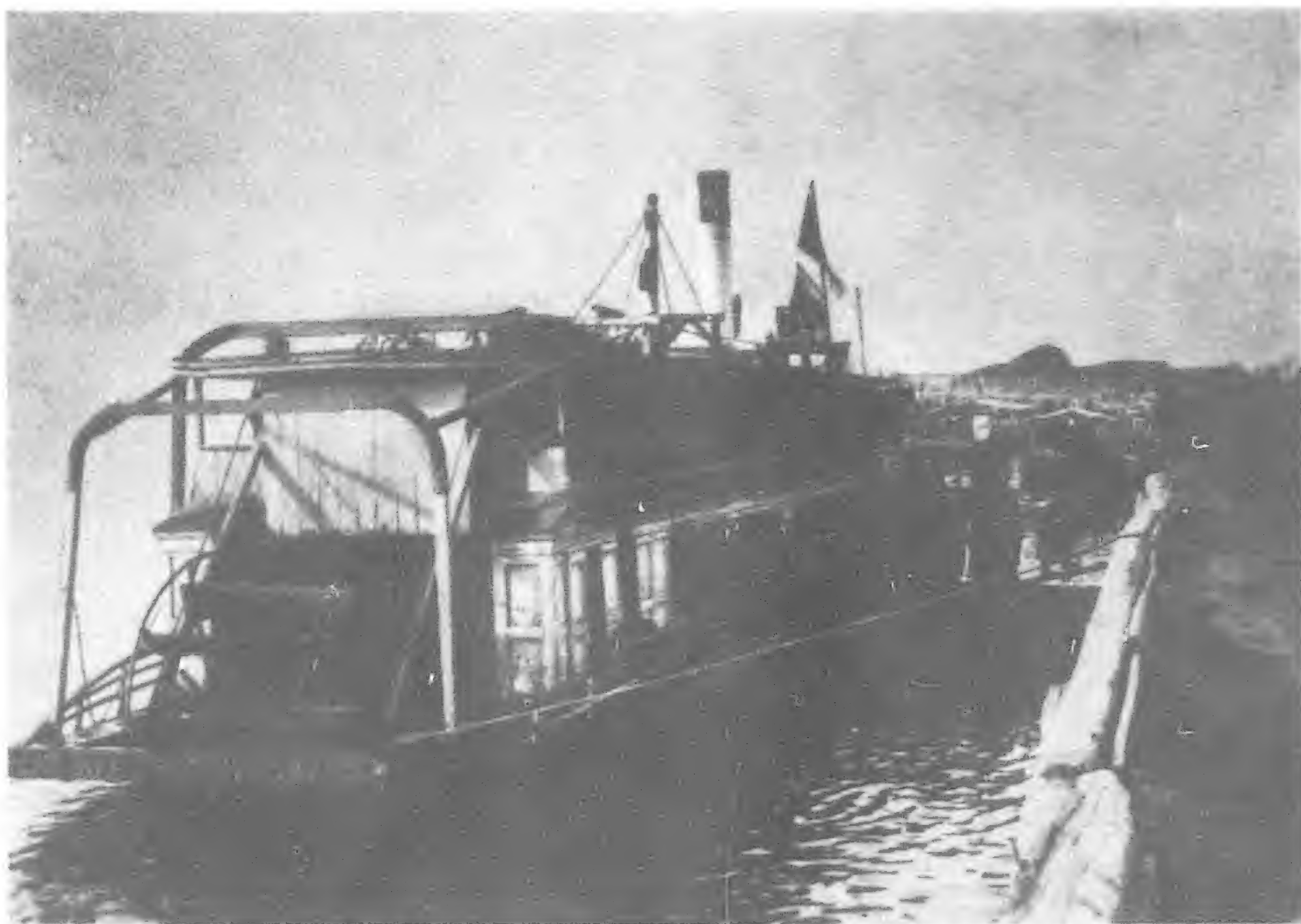
reasons; the first reason was the employment of more personnel to bring the number to efficient working level, and second is the extra expenditure defrayed for railway reconstruction in the area visited by flood in 1933. However, the actual balance for 1934 exceeds that of 1933 by MY.5,871,573.58 which is about 57 per cent of the 1933 balance. This increase must be considered as being nothing but phenomenal.

The figures for 1935 are mere estimates which are calculated in a similar manner as were the 1934 estimates based on past experience and careful investigation of general economic conditions along the railways. Consequently, if unforeseen change of factors does not occur in the meantime, the railway expect to earn in the neighborhood of MY.22,582,212.00. It must be noted, however, that figures for the former Chinese Eastern Railway are not included here for they are still in the process of calculation.

Mention must here be made that due to reorganization of the system of management which took place on April 1, 1934, the accounts since 1934 (actual figures) are made for each railway direction instead of for each line as prior to 1934 (estimate), inclusive.

If comprehensive figures for the year prior to the "Incident" were available, they will serve to make an interesting comparison with the figures given here, but since piecemeal figures, the only one available are more apt to create misunderstanding than intelligent comparison, no such attempt is made here. However, the accomplishment of the General Direction in 1934 should be sufficient to dispel all doubts as to the fact that the railways are now far better managed than before.

It must be added, however, that inasmuch as the General Direction wishes to continue increasing the revenues, the relative income is naturally expected to decrease with the addition to its administration of certain of the railways, mentioned above, until such



River steamer on the Sungari operated by the General Direction of the Manchoukuo State Railways



Shipping on the Sungari

time that such railways, being extended into maiden territory for the purpose of providing more rapid progress of the country than if it were left to its natural course, will be able to pay their own expense as a result of the progress enhanced by the railways themselves. This policy at the outset will entail tremendous sacrifice on the part of the railways, but in the long run it is for the good of the country as a whole.

### Bus Lines

Manchoukuo was fortunate in that she could profit by the experience of American and European continents in the use of modern auxiliary facilities.

Operation of motor-car transportation side by side with the railway is one of the most important lessons she learned from them. Had American and European railways foreseen the severe competition of motor-car traffic, perhaps, an altogether different situation might now exist in their respective continents.

Profiting by the experiences of others, the Manchoukuo Government has entrusted the General Direction with sole rights to operate practically all the bus lines with but very few exceptions. The Government, on the other hand, is rapidly completing its program (begun in 1932) of building 60,000 kilometers of national highways and as soon as the roads are finished many new bus lines are to be operated by the General Direction.

The bus lines now under actual operation by the General Direction are as follows:—

		Total Km.
Antung-Chengtzutun Line		296
Antung-Chengtzutun	214	
Huangtukan-Fengwangcheng	82	
Shanchengchen-Tunghua Line	145	145
Mukden-Fushun Line	56	56
Haicheng-Niuchuang Line	25	25



Russian Railway Guards that man trains of the Manchoukuo State Railways



		Total Km.
Mukden-Chengchiatun Line		119
Mukden-Faku	89	
Faku-Kangping	30	
Hsinmin-Changwuhsien Line	62	62
Jehol Line		939
Peipiao-Chihfeng	230	
Chengte-Fengping	100	
Chengte-Chihfeng	265	
Chihfeng-Linhsi	210	
Weicheng-Dolonnor	130	
Lingyuan-Lingyuan Station	4	
Hsinking-Kirin Line	126	126
Hsinking-Taonan Line		110
Lungchuan-Taonan	110	
Tunhua-Hailin Line		170
Tunhua-Kuanti	32	
Ningan-Hailin	30	
Tungmen-Maho	28	
Tunhua-Omu	50	
Kuanti-Omu	30	
Tungman Line		235
Tumen-Hunchun	73	
Hunchun-Tunghsingchen	100	
Tungning-Suifenho	62	
Noho-Heiho Line		392
Aihun-Heiho	33	
Aihun-Chikote	114	
Heiho-Hantachi	124	
Noho-Puhsi	30	
Noho-Nonchiang	91	
Hsingan Line		406
Chitaokow-Halunarshan	16	
Halunarshan-Hailar	285	
Taonan-Tuchuan	105	
Tsitsihar-Chaluntun Line		
Tsitsihar-Kannan	107	107
Harbin-Tungchiang Line		916
Harbin-Hulan	23	
Hulan-Mulan	122	
Mulan-Chiamussu	273	
Chiamussu-Tungchiang	218	
Chiamussu-Poli	160	
Fuchin-Paoching	120	

Total Kilometerage of 15 lines 4,104



A group of Railway Protective Scouts in the service of the Manchoukuo State Railways

Besides the above-mentioned lines more than 4,000 kms. are under project.

### Earnings

The following figures show earnings from operation of bus lines:—

	Revenues	Expenditure	Balance
1933	586,767.48	1,397,631.76	— 810,864.28
1934 (estimate)	2,248,549.00	2,096,161.00	151,388.00
1934 (actual)	1,265,290.02	1,925,213.55	— 659,923.53
1935 (estimate)	2,760,142.00	2,690,539.00	64,603.00

Since only little over three years have elapsed after the commencement of this comparatively new enterprise it is hardly reasonable to expect the operating ratio to be favorable, especially, in this sparsely populated country. However, with the popularization of this form of transportation and with the increase of population the General Direction expects to make both ends meet within a few years.

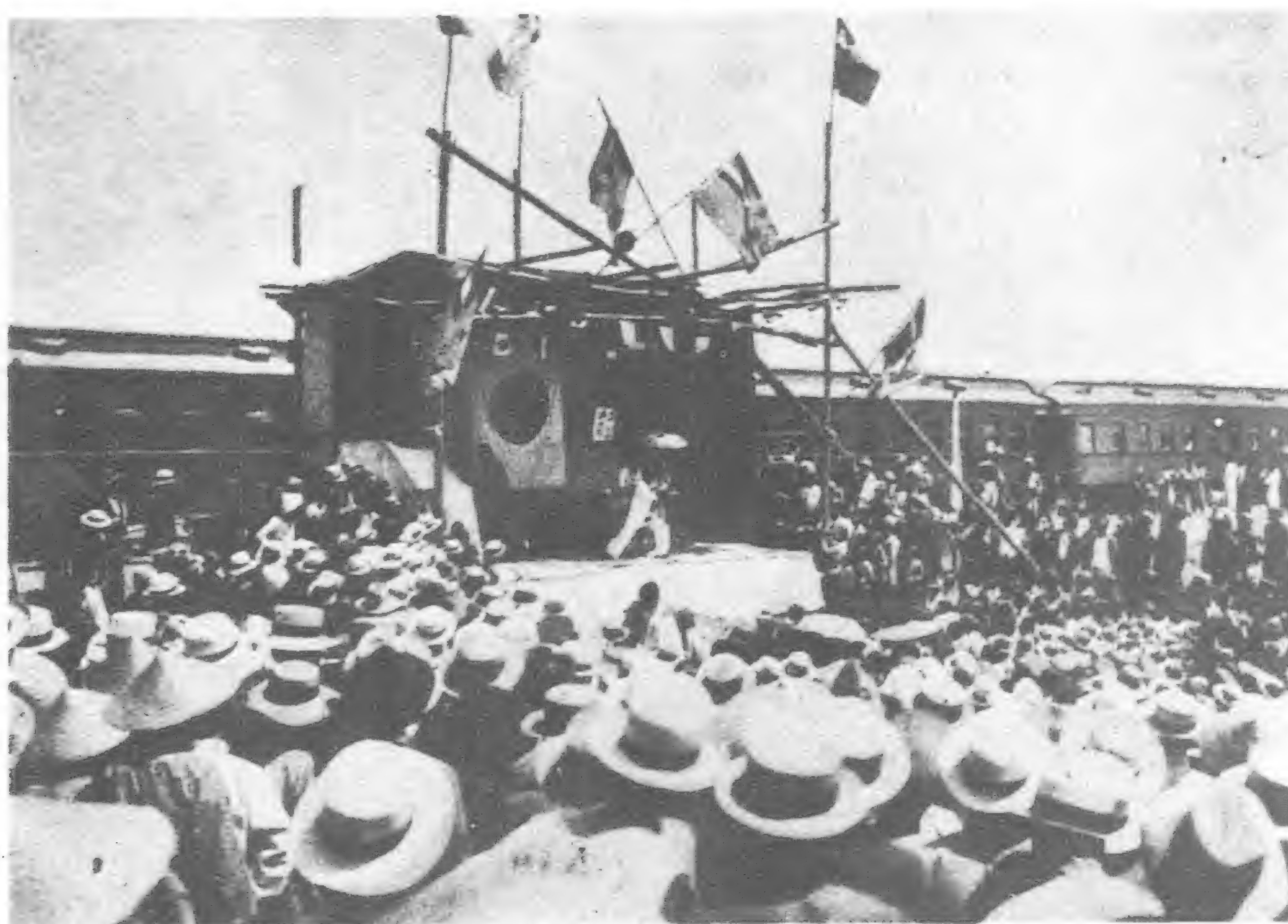
As for the fiscal year 1934 it was estimated, as shown above, to realize a balance of MY.151,388.00, but owing to the adverse weather condition the roads which are still insufficiently paved, were damaged and traffic consequently retarded. Under such circumstances the camel and horse traffic were placed in a better position to compete. Moreover, the roads included in the highway construction program, from which comparatively high revenues were expected, were not opened for traffic as planned. Thus, the expected profit was not realized.

### River Navigation

The river navigation, having very close connection with railways as in the case of buses, is also operated by the General Direction. Before the "Incident," however, this was operated by various organizations, such as:

1. River-Transportation Bureau of the North Eastern Navy.
2. North Eastern Navigation Bureau.
3. North Eastern Shipyard.
4. Navigation Administration.
5. Watercourse Bureau.

After the "Incident" these organizations were taken over by the Government who later entrusted their operation (excepting the last two) to the General Direction when it was



Performance troupe giving program, with "Comfort Train" in the background



established. Thirteen months later, on April 1, 1934, the General Direction amalgamated all these organizations into one entity and created what is called the Harbin Navigation Association, because, had individual shipowners been left to compete among themselves, it would be almost suicidal to all concerned. And to control this Association the Harbin Direction for Navigation was established at Harbin by the General Direction.

Important rivers on which the Association operates its vessels are the Sungari, Amur, Liao, Nonni and Yalu. And the routes operating now are as follows:—

Sections	Kilometerage
Harbin-Fuchin	614
Harbin-Heiho via Fuchin	1,418
Heiho-Moho	827
Moho-Kilarin	623
Harbin-Hulin	1,286
Hulin-Lungwangmiao	286
Hulin-Mishan	350
Harbin-Chiangchiao	503
Harbin-Kirin	738
Total	6,645

With a view to enhance development of the upper streams of various rivers in North Manchuria, it is planned to build high class light draught ships during 1936 for both passenger and cargo to be placed on service on Moho-Kilarin and Hulin-Mishan lines.

As for the navigation on the Yalu and Liao rivers, the situation has not yet reached the stage where modern navigation is in urgent demand, so that although the General Direction is vested with rights to operate vessels on them, at present it is still investigating the real conditions obtaining on these rivers. So far junks and rafts have been sufficient to take care of what traffic there is on the two rivers.

### Earnings

The following figures show earnings from operation of the river routes:—

	Revenues	Expenditure	Balance
1932 .. ..	899,353.35	1,769,703.82	-870,350.47
1933 .. ..	1,331,969.77	1,568,836.15	-236,866.38
1934 (estimate) ..	1,216,249.00	1,255,465.00	-39,216.00



Open cut of the Sian colliery. The coal seams extend four miles from east to west and are about a mile and a half in width from north to south. The immense deposit contains both anthracite and bituminous coals and the colliery's annual production runs to 300,000 tons



The Sian Colliery of two open cuts and two pits at Sian, western terminus of the Sian Railway which connects with the Mukden-Kirin Line to the east

	Revenues	Expenditure	Balance
1934 (actual) ..	1,582,523.10	1,242,445.09	340,078.01
1935 (estimate) ..	1,230,547.00	1,007,710.00	222,837.00

There are great deal of difficulties to be met in realizing much larger profits from this traffic. Due to severe winter, the routes may only be operated about seven months of the year, yet the personnel has to be maintained even during the freezing season practically in full force. Moreover, such routes as Harbin-Hulin, Harbin-Kirin and Heiho-Moho routes are purely sacrificial routes for service to the public, because there are no other modern means of transportation available connecting these points. Added to these already adverse conditions a great deal of the traffic is expected to be diverted to the railways when the projected ones are completed; consequently it is considered almost impossible to obtain any profit from this enterprise. The most that could be expected is a par between revenue and expense.

In view of this fact the General Direction, in order to realize better results, is sparing no effort in curtailing unnecessary expenses by efficient use of vessels, by elevating the efficiency of personnel, etc., and in finding new sources of revenues, such as, by opening up new paying routes, attracting traffic and popularization of this means of transportation.

However, during the fiscal year 1934 a profit of MY.340,078.01 was realized, although it was estimated that the loss would be MY.39,216.00 as shown in the table. This increase is due to the increase of goods traffic by 204,000 tons from last year's bumper crop of soya beans and increase in the coal demands in the north following the increase of population.

### Supplementary Enterprises of the General Direction

Besides the transportation facilities that have already been dealt with the General Direction is conducting various public enterprises such as the development of local industries, spreading of education, implanting of sanitary ideas and maintenance of peace and order along the railways. In other words the mission of the General Direction does not stop at merely carrying passengers and goods, but it also involves those enterprises that will help to enhance the general development of the country which might of course mean business to the railway in the not distant future.

(To be continued)









The engines are being built at their Rugby Works, the electrical gear at their Bradford Works and the coach bodies, underframes and bogies at their Preston Works. Furthermore after the coaches have been completed and erected a final test will be carried out on each 4-coach unit on the test track which The English Electric Company possess at their Preston Works, so that the coaches will be sent out to Colombo complete and ready to go into service.

Final agreement on the proposal was reached recently at negotiations between Vice-Admiral Takuo Goto, president of the Showa Works, and Mr. Reisaku Nakai, president of the Japan Iron Manufacturing Company.



# Aurora University of Shanghai

## PART II

(Concluded from September Number)

**A**T the head of each Faculty is a Dean, who, if he judges it necessary, may at any time call a meeting of the professors of the Faculty in order to examine the different questions relative to the studies in that Faculty and to submit them to the authorities of the school.

The Deans are :

Faculty of Medicine	—Dr. Bussière, M.D.
Faculty of Sciences	—Rev. Fr. Lejay, D.S.
Faculty of Law	—Rev. Fr. Bonnichon, LL., D.D.

### Life at the University

One of the criticisms directed at the Universities of China by the Commission of Enquiry of the League of Nations is that too great a distance separates the professors and the students. Seeing one another only in class, in the lecture halls or laboratories, their relations remain respectful certainly, but quasi-official and too distant.

This is a reproach which cannot be directed at Aurora. The Administration of the school has at heart the augmenting of cordial relations between the professorial staff and the students and the fostering of all occasions of social intercourse. Every student knows that at Aurora he has in each professor not only a conscientious and devoted teacher, but also a friend whom he may always consult in the difficulties of his scholastic life.

Visitors to Aurora are often struck by the marked simplicity which characterizes the relations of all those who dwell at Aurora and which contributes to joy and good humor as well as to good studies. If there be question of the editing of a scientific or literary bulletin, of the composition of a thesis in law, of the preparation of a musical entertainment or an athletic meet, a real co-operation is spontaneously manifested between teachers and students for the greater good of the group. Familiarity in relations does not, however, beget disorder. There is no common life possible without a certain discipline and the authorities of the University watch over this with particular care.

A lack of perseverance in work, a lack of respect towards professors, every attempt at agitation in the school, all speech or conduct which might do harm to the reputation of the University, is considered a serious fault. Clear and concise regulations are

posted in the dormitories of the boarders and all must strictly conform to them.

The greatest liberty is given all students to practice their respective religion. Catholics, protestants, members of the Orthodox, Buddhist, and Jewish religions are received at Aurora without distinction. A daily Mass is said for the Catholic students at which they may assist. A course of religion is offered them, at the end of which, after an examination, they may obtain a diploma of secondary or higher religious instructions, as the case may be. Those who have talent for public speaking may also receive a diploma to lecture. Many of the Catholic students are grouped into a Sodality under the direction of a Spiritual Father.

### Artistic and Literary

Dramatic and musical presentations which throughout the year bring the students together in the Auditorium. These presentations, it goes without saying, are most conducive to the formation of youth. They teach the pupils to appear in public and to interpret selections from the grand old masters and often even entire compositions are given. Molière has been frequently honored on the stage of Aurora. *Les Femmes Savantes*, *Le Malade Imaginaire*, etc., have justly merited great commendation. At times attempts have been made, and not without success, to portray contemporary bits. Edmund Rostand would doubtless have been surprised and enraptured to have seen *l'Aiglon* interpreted, at least in its most chivalrous parts, by young Chinese.

The professors of Aurora, or of other Universities, or even passing visitors, are invited from time to time to give conferences in Chinese or in French.

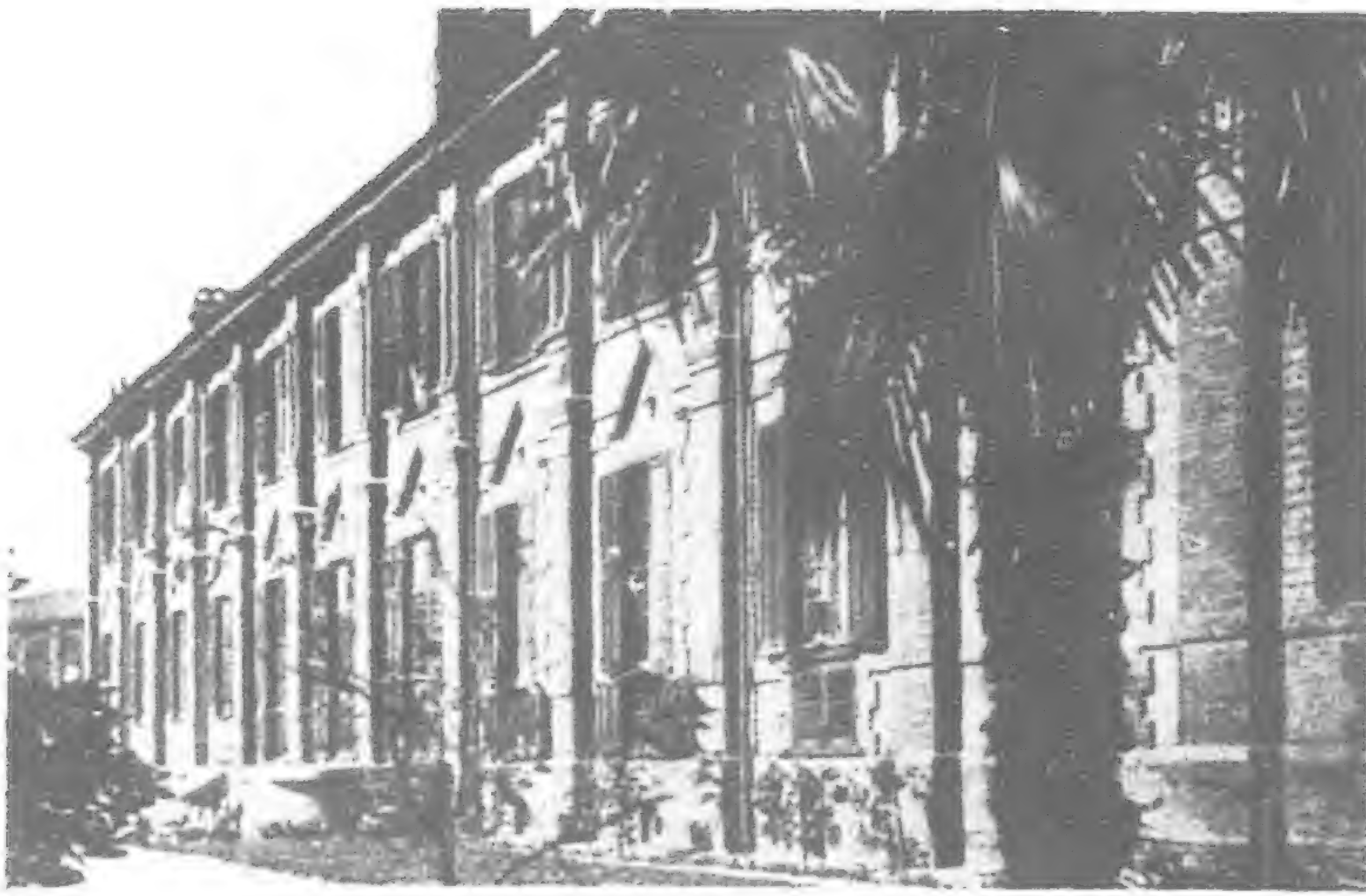
All subjects are treated : medical, scientific, literary and social. When circumstances allow, a series of conferences is given on some determined question. Thus, the Law Faculty some years ago quite successfully organized some conferences which were really classes in French, Chinese and Roman Law for people in Shanghai whose occupations prevented their following regular classes.

The musicians of Aurora are grouped together into a Musical Association, in which European instrumental music with violins and violincellos, as well as the Chinese orchestra, has a place of honors. Occasionally, outside artists are invited and many famous concert.



Architect's drawing of the new building at Aurora University as it will appear upon completion. The eastern wing (on the left), is the building just finished and brought into use. The central structure and the corresponding western wing are to be built in the future





Residence of the Jesuit Fathers



Laboratories of electricity

can still be remembered, such as that which was given by Mr. Bilevsky, grand prize of the Conservatoire de Paris, and Mr. Gontier, highest award of Rome.

A band has been formed which contributes, noisily enough, to the joy of school celebrations and at the large athletic meets it is used to salute the victors. All these presentations take place in an Auditorium capable of holding 1,300 people, 300 of whom are accommodated along the balcony built at the back and sides of the hall.

### Sports

The University, in order not to fail in a task which has become almost a national obligation, has launched forth resolutely in the way of sports. More than a quarter of the total number of more than 600 students engage in some branch of sport; football, tennis, volleyball, basketball or pingpong.

At Aurora every sport finds its devotees; and as the school has put at the disposal of the students all that it possibly can provide in the way of youthful recreation many a Club in France would be envious of the vast fields for sports—five hard tennis courts, two fields for "small ball," two basketball courts, a volleyball court, a broad jump pit and a cinder track. The equipment, it is true, is not as complete as it is hoped it will be in the near future. The field for Association football is one of the best in Shanghai and is often used for important matches by the Shanghai Catholic Sportive Association; and the English soldiers of Shanghai are never tired of praising what is commonly known as the "Aurora Ground."

Athletics at Aurora, however, is not cultivated for itself. It is considered as a recreation and a relaxation from studies between classes and for holidays. Shanghai has never been dazzled by the star accomplishments of an Aurora athlete. Indeed, the directors of athletics at Aurora would rather strive to subdue the budding qualities of a good athlete in order to avoid injury to the reputation for study which Aurora enjoys in serious Chinese circles.

In directing the athletics of the students, the authorities of Aurora seek above all to make them relax from intellectual efforts and not, as in many other institutions, to make machines out of them in order to break records or fashion living advertisements for their school. After long hours of study, after serious periods of work in the class rooms, after the fatigue of the examinations, what better relaxation than exercising in the open air, and what more beautiful application of the old Latin adage *mens sana in corpore sano*.

### Faculty of Law

The Faculty of Law occupies an important place in the life of the University.

An attraction from the first beginnings of Aurora, it began to function regularly in 1911 when Rev. Fr. de Lapparent began the teaching of Civil Law. Courses in Roman Law, Criminal Law, Chinese Law and Political Economy were then added. The Faculty was enlarged in 1917 with the arrival of new Professors from France. In March of that year, M. J. Hervé Bazin, son of the eminent Professor of the Faculty of Law of Angers and nephew of the lately deceased Academician, arrived in Shanghai. The new Professor had for ten years filled the chair of Roman Law at the Faculty of Angers. An alumnus, Mr. Kiang Ching-chu, a publisher in Shanghai, wishing to complete the study of Law which he had undertaken for three years at Peking, came to take his place among the students.

A few months later, more good fortune came to Aurora in the person of M. Julien Barraud, from Peking. Professor of Law for many years at the National University of Peking, he had, at the request of the Chinese notables, drawn up plans for a Constitution. Thus, he was already in close touch with Chinese affairs and with the mentality of Chinese students. Having specialized in both ancient and modern Chinese legislation, and having a large law practice in the Mixed Court, he was able to give the students the benefit of his valuable experience.

Other Professors came in their turn, such as: M. Marcel Barraud and M. the First President de Goth, etc., while to their number were added some who had been students in the first days of Aurora. Among these were Mr. Ku Shih-hsi and Mr. Yuan Chia-huang.

All these Professors had at heart to give their pupils not so much an erudite knowledge of codes, as that sound juridical mind which by its compass, its logic and its clarity brings honor to French Law.

In June, 1915, there were given, for the first time at Aurora, "Diplômes supérieurs de Droit" and in June, 1917, the first "Licencié en Droit" was bestowed.

Little by little the programs of the Faculty were developed and made more precise. They soon comprised all the principal courses of the best Colleges of Europe.

### Juridical Section

China's endeavor since 1911 to change her constitutional and juridical order is much more astonishing and far more radical than that by which she strives to introduce material progress and develop modern industrial life. The various plans of a Constitution which have been elaborated and offered are far removed from the millenarian past which immediately preceded the revolution of 1911. As to the codes drawn up a few months after 1928, they constitute the most profound upheaval ever known in the history of Chinese Law. Nothing in any other country can compare with it.



Other dormitories at Aurora



It is this unique case which gives to the life of the Law Faculty of Aurora an extraordinary interest. Born in 1911, at the very moment of the Revolution, it can bear witness to that juridical metamorphosis and can study its origin.

For many years it was impossible to teach anything on the subject of Chinese Law except the Code of the Ch'ing and the rather sketchy history of the ancient Chinese institutions. There was added to this the study of jurisprudence of the Mixed Courts, where equity often supplied in the absence of texts.

To this teaching was added that of French Law, which, having already been for so long the guide of many a European Code, could still serve to inspire the future legislators of young China.

Then, only a few years ago, appeared at very close intervals the new Civil, Penal and Procedure Codes.

Neither the Professors of Aurora, who had followed all the preliminary work of inquiries and provisional laws, nor the students, who through a serious initiation in French Law were entirely receptive to these new Chinese Codes so like those of Europe, were taken unawares.

Nevertheless, the teaching of Law was really transformed. The study of the Chinese Codes became the principal subject matter of the course and was distributed according to the system of the French curricula. New Chinese Professors were invited to give courses. Those chosen were not newly graduated students, but the Presidents of Courts, judges and lawyers who had acquired from a long practice necessary experience for the teaching of Codes which are still somewhat poor in jurisprudence, and which, though having the characteristic of western procedure, require the most ingenious interpretations in order to avoid violating too rudely the customs of centuries.

These new Codes, deliberately, no doubt, in order to impose more rapidly the new reforms, wished to ignore the greater number of these customs. The conflicts which resulted in their application are the inevitable price of an experiment which will make a departure between reforms that are lasting and those which must yield to truly unchangeable and useful traditions.

It is this present experiment, so full of promise for the future, which brings to the juridical studies of the Law Faculty an entirely new interest and imposes on it a direction which its masters have known how to discern. To limit themselves, as has been done in other Faculties in China, to the study of the new juridical texts, while merely referring to the European codes which have inspired



Buildings of the preparatory courses at Aurora University

Chinese Institutions and the History of ancient Chinese Law. From the very first year, therefore, a class in these institutions teaches the student into what ancient framework all the prescriptions of the modern Codes should fit. As to the study of ancient Law, the Professors consider that the place that is given it on the program ought to be greater and greater according as the publication of truly scientific texts and monographs on ancient law are multiplied

and thus allow the presentation to the students of an historic synthesis, which is not yet outlined.

Besides, the teaching of Roman Law by a European Professor well versed at the same time in ancient Chinese Law, brings out comparisons which are at times curious, but always suggestive.

In this new orientation of juridical instruction at Aurora, the study of French Law and of Comparative Law remains no less necessary than heretofore, for pedagogical experience, as well as good sense, proves that this study still remains one of the best introductions to the

understanding of the texts of even modern Chinese Codes. This is why in the programs of Aurora, each book of the Chinese Codes is handled in general, only after a study of the corresponding book in the French Code. The student then has the impression of entering a field already known and the particular prescriptions of the Chinese text become enlightened by the remembrance of the principles and the texts which were their principal source.

Furthermore, the Courses of Civil and Penal Procedures have been specially developed. To them have been added exercises of legal practice and court hearings. Very often, indeed, the young Chinese graduate passes, with hardly any transition, from the University to the bar or the tribunal. He must then acquire as much as possible from the Faculty that experience which would otherwise be ordinarily obtained only after many years of practice.

More surprising still may appear the part assigned in the programs of Law to the study of Chinese and French Literature, Philosophy and History. This is explained by the anxiety to develop as far as possible a "secondary" culture, at



The faculty of law, which has been removed to the new building at Aurora

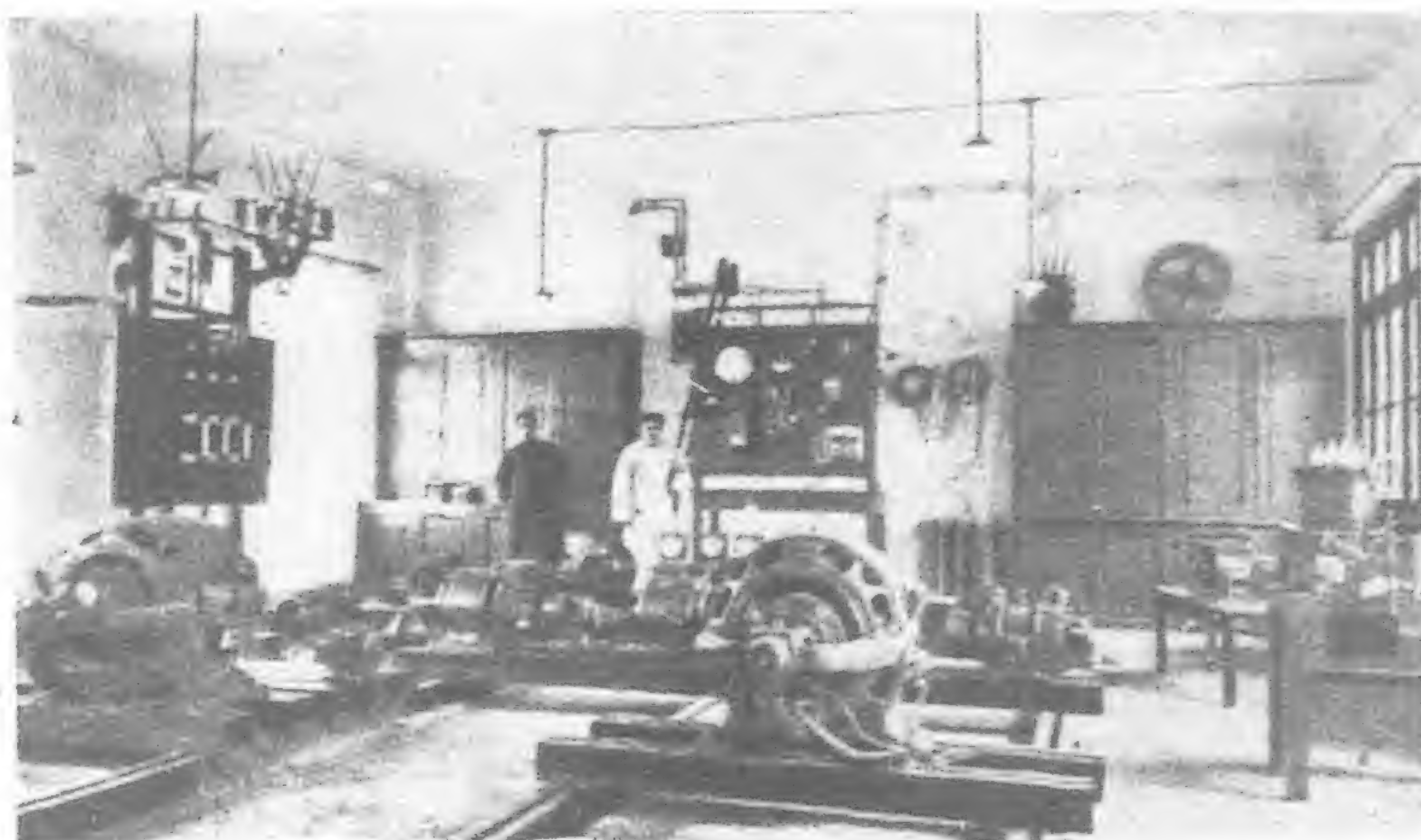


The faculty of medicine





One of the dormitories for the students



A section of the physics laboratory, showing electrical machines

times deficient, and without which legal studies can only remain superficial and bookish.

### Political Economy Section

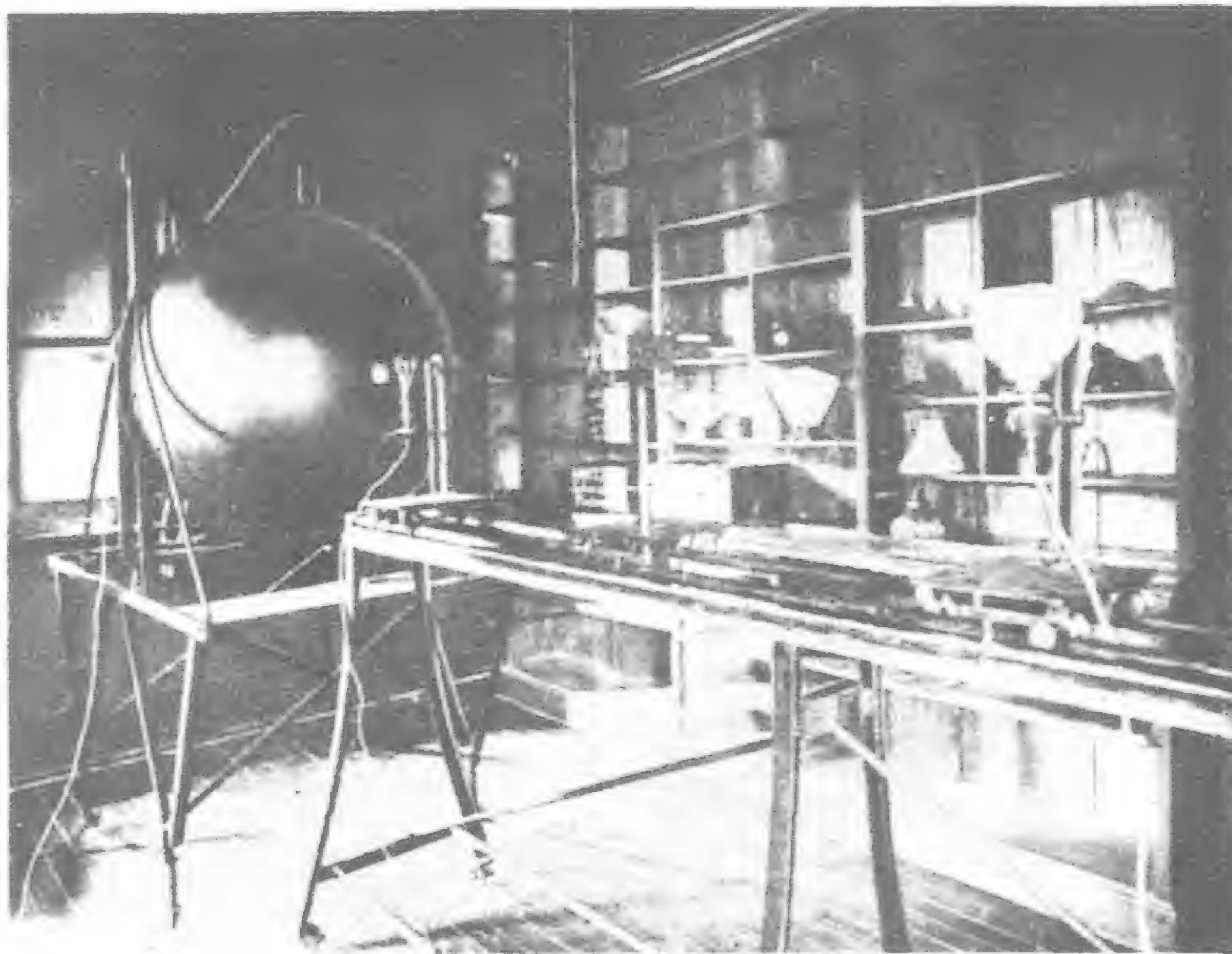
For twenty years the Law Faculty of Aurora was devoted to one single kind of instruction in preparation for a Licentiate. Following the system of the Universities of France and other countries, the program was almost entirely juridical. Once the Licentiate was obtained, the student prepared, according to his ability, for a "juridical doctorate" or an "economical doctorate."

But the extraordinary favor which Political and Economical Sciences enjoy in China, as well as the practice of the majority of Chinese Universities, led to the founding at Aurora in 1932, of a "Political Economy Section" of the Law Faculty.

While satisfying the desires of students less inclined towards purely juridical studies, this new section also fills a real need in China. The economical, industrial and social transformations which are succeeding one another so rapidly, are the fruit of a deliberate attempt and not of a slow evolution. Hence, theoretical principles

have here a greater influence than in other countries. Doctrines, more often imported from abroad, here supply for experience which has not yet had time to develop.

This is why from the very beginning of the Law Faculty of Aurora, a particular value has been attached to the study of Political Economy, of the History of Economic Doctrines, of Economic Geography and of Finance. In spite of the fact that it is extremely difficult to gather together documents in all these subjects, the Professors have always striven to develop phases all concerning China.



Photometry laboratory at Aurora

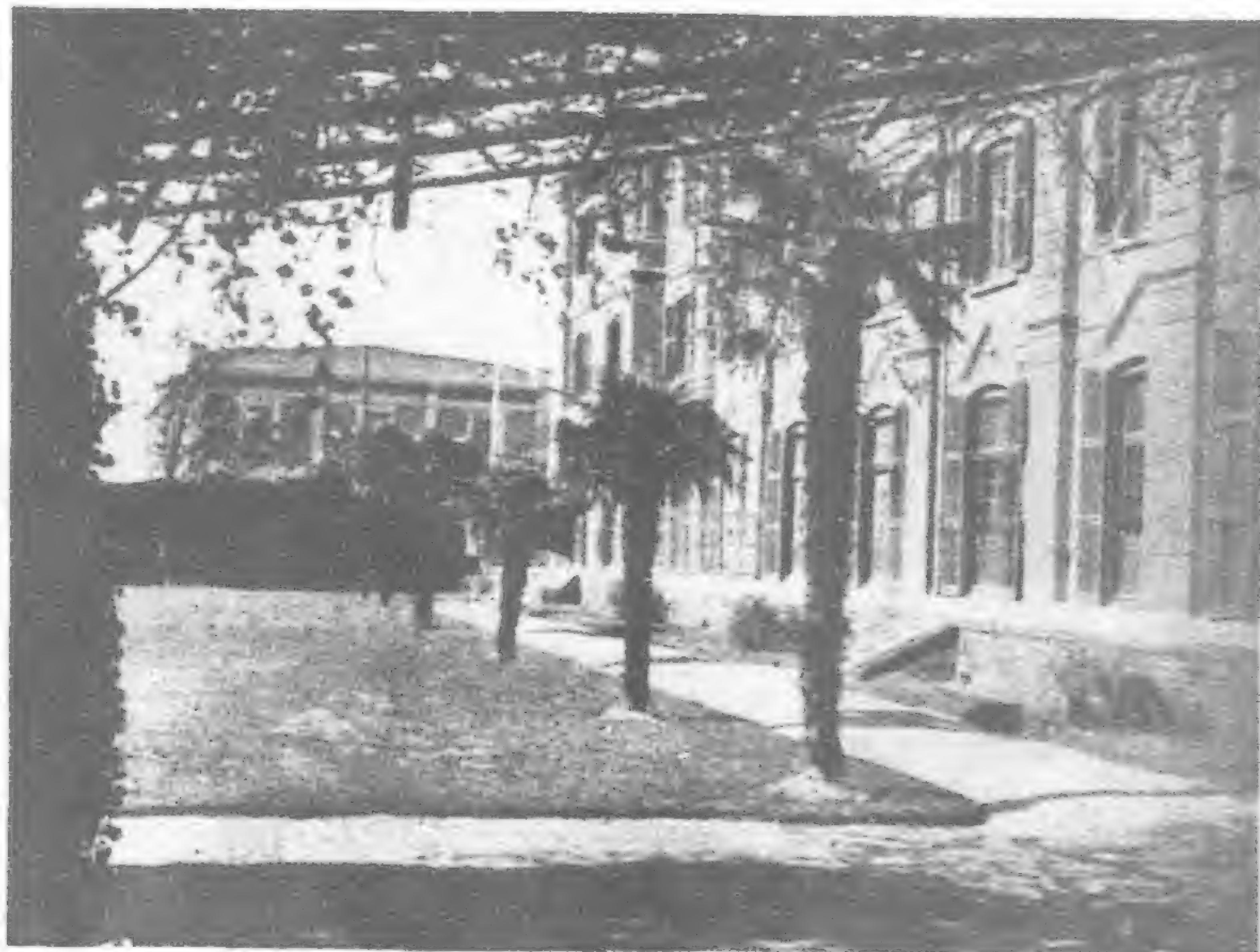
### The Faculty of Medicine

In 1908 Aurora left the narrow confines of Zikawei and took up its abode in Shanghai close to the four small buildings which at that epoch constituted St. Mary's Hospital. It was not chance that led the University to the site of a medical establishment. It was thus hoped that a long sought for project would be realized: the foundation of a Faculty of Medicine.

In 1909, Fr. Allain being at the period Director of the University, a Pre-medical Course was commenced, with both theoretical and practical courses, thanks to the initiative of F. Le Coq. But it was only under the government of Fr. de Lapparent in 1912 that the first courses in Medicine were inaugurated.



Building of the chemistry laboratory



The faculty of sciences building



Dr. Ricou and Dr. Pellet undertook the medical instruction. At the same time, the students went to St. Mary's Hospital for clinic work every Monday, Tuesday and Saturday. In June, 1917, the first two degrees of Doctor of Medicine were conferred. The two candidates had completed two years of Pre-medic and five years of Medicine. The arrival of Dr. Siberil in 1916, and then that of Dr. Florence, contributed greatly to the prosperity of the Faculty. The former was destined to remain as Professor for fifteen years and to die at his task, universally mourned by his colleagues and his pupils.

Dr. Siberil developed the teaching of anatomy at Aurora and it is in the building constructed according to his plans that the present students perform their dissection work.

With such men, the Faculty could not help but prosper, and it has never ceased in its development. For the number of its students, the merit of its professors, and the excellence of its medical installations, the Faculty of Medicine of Aurora is unquestionably among the very first in China. Not only do Chinese youths apply for admission into this course, but also a few foreigners: Russians, Filipinos, Japanese and even some Europeans have asked for admission. Aurora up to the present has admitted very few foreigners to the College, in order to keep open as many places as are needed for Chinese students.

The professorial corps is composed of French and Chinese doctors. Many of them are at the complete disposal of Aurora and devote all their time to the students. Others are in charge of certain special courses. All have had long years of practice and teaching and experience in China, enabling them to adapt, as far as possible, their teaching to the needs of their pupils.

The medical installations are already fairly complete and are being improved constantly. An entire building is devoted to anatomy and to operative medicine. Laboratories of physiology, bacteriology, biological chemistry, etc., are destined to complete the theoretic teaching by practical experiments. Nothing has been neglected which can possibly give the future doctor as complete a formation as possible.

Aurora has at its disposition two hospitals: St. Mary's Hospital and the Hospice of St. Anthony. Here the students of medicine spend a great part of their day. On at least two separate occasions Aurora has had an opportunity to manifest the sterling qualities of its doctors. The first was in 1926, during what may be termed the Expedition of Pang-pu; and then later, in 1932, in Shanghai itself during the Japanese War.

### The Expedition of Pang-pu

In 1926, Sun Chuang-fang and Chang Tso-lin were fighting. The town of Pang-pu (Anhwei), situated close to the fighting, became an important center for the care of the wounded. More than 1,500 of them lay without help, the Society of the Red Swastika being unable to tend to all the needs, despite its great and generous efforts.

This Society for the help for the wounded appealed to Aurora, with the result that Aurora put at its disposal the pupils of the last year of medicine. They left in company with one of their professors, Dr. Siberil, and were soon joined by Doctor Brugeas.



Building erected for the care of poor patients in connection with St. Mary's Hospital

"The arrival was triumphant: but every necessity was wanting and it was necessary to provide rooms for the patients and places which might serve as operating rooms. We began by disinfecting and cleaning everything around us and then set to work."

A few days later a witness wrote: "The initiative of Aurora has been greatly appreciated, full justice is given to the devotion of the students. Their skill in operating has struck many with admiration. Theirs is not the idea of amputating at any cost, and they are worthy of the greatest confidence."

Father Barmaverain wrote under date of November 20: "The doctors of Aurora have gained the respect and admiration of everyone. They have resolved the most difficult cases and performed very serious operations."

Some weeks later, they had to return to the University and resume their classes. This brought desolation to the wounded when they saw those whom they called "good doctors" leaving them.

"It is indeed touching," wrote one of the students, "to see how our wounded deplore our departure and some of them have even wept on learning that we were to leave them so soon. We have not only ministered to their bodies, but we have won their hearts: this will be a recollection which we will never forget as long as we live."

### The Japanese War

In January, 1932, while the battle was raging in Shanghai and Woosung, some twenty students of medicine left for the front and served at the military field hospital of Chen-ju.

A little later, at Aurora itself, the auditorium and another building were converted into a field hospital and Aurora became the 28th temporary hospital.

It seemed for a moment that we would be submerged by the wounded and there were some who were in a pitiful condition. Some hours after the arrival of the first group of wounded, all had



New building for the care of isolation cases connected with St. Mary's Hospital





General view of the Heude museum building on Avenue Dubail at Aurora University

at least a mat to lie upon and they were bathed and their wounds were dressed. In a short time they all had beds and an operating room was improvised.

More than 300 wounded were thus cared for during this sad period by the professors and students of the Faculty of Medicine. Numerous gifts received made it possible to carry on things on a large scale and a strict administration watched over everything.

Mr. Wu Te-chen, Mayor of Greater Shanghai, on a visit which he made to the wounded, did not hide his admiration, and the head of the Red Cross rendered this beautiful tribute: "The 28th hospital was one of those where the least number of deaths occurred, thanks to the hygiene and the care which were assured by the doctors there. It was also one of those which spent the least amount of money."

These two events deserve to be mentioned in a history of the Faculty of Medicine. They helped to place the students of Aurora on vedette and to show to the world the value of the medical training of the Faculty and the technical skill of the young students, who even before completing their studies could render such signal service.

### The Hospitals

Two institutions with which the medical students of Aurora have close contact are St. Anthony's Hospice and St. Mary's Hospital.

St. Anthony's hospice is situated at 141 Avenue Dubail, only five minutes' walk from Aurora. St. Anthony's Hospice was founded for the poor, and it may be truly said, for the poorest of the poor. Directed by the Daughters of Charity, it contains at present 100 beds. Each morning the students of the third year of medicine receive there a practical course in medical semeiology and small surgery.

The history of this hospital dates back almost as far as that of the University for it was in 1907 that it was founded. At that time it was a good distance from Shanghai in open country, and to-day visitors are shown, hidden away in the midst of the buildings, a little pagoda which in those days served as a rendezvous for hunters.

The buildings were very modest, only four in number. One for the sisters, one for the help and two for the patients: fifty beds in all. That was all that existed when the first eight Daughters of Charity arrived to found and organize the new hospital.

The task was a large one. It was a question not only of perfecting the hospital service already organized in different places by the mission for the Chinese people, but of creating a modern hospital, with medical and surgical services where the rich and the poor would be received without discrimination.

In 1908 it became necessary to build the St. Vincent's building with accommodations for 90 poor. In 1910 a small building for sick prisoners was constructed. The World War intervened and marked a period of rest from expansion.

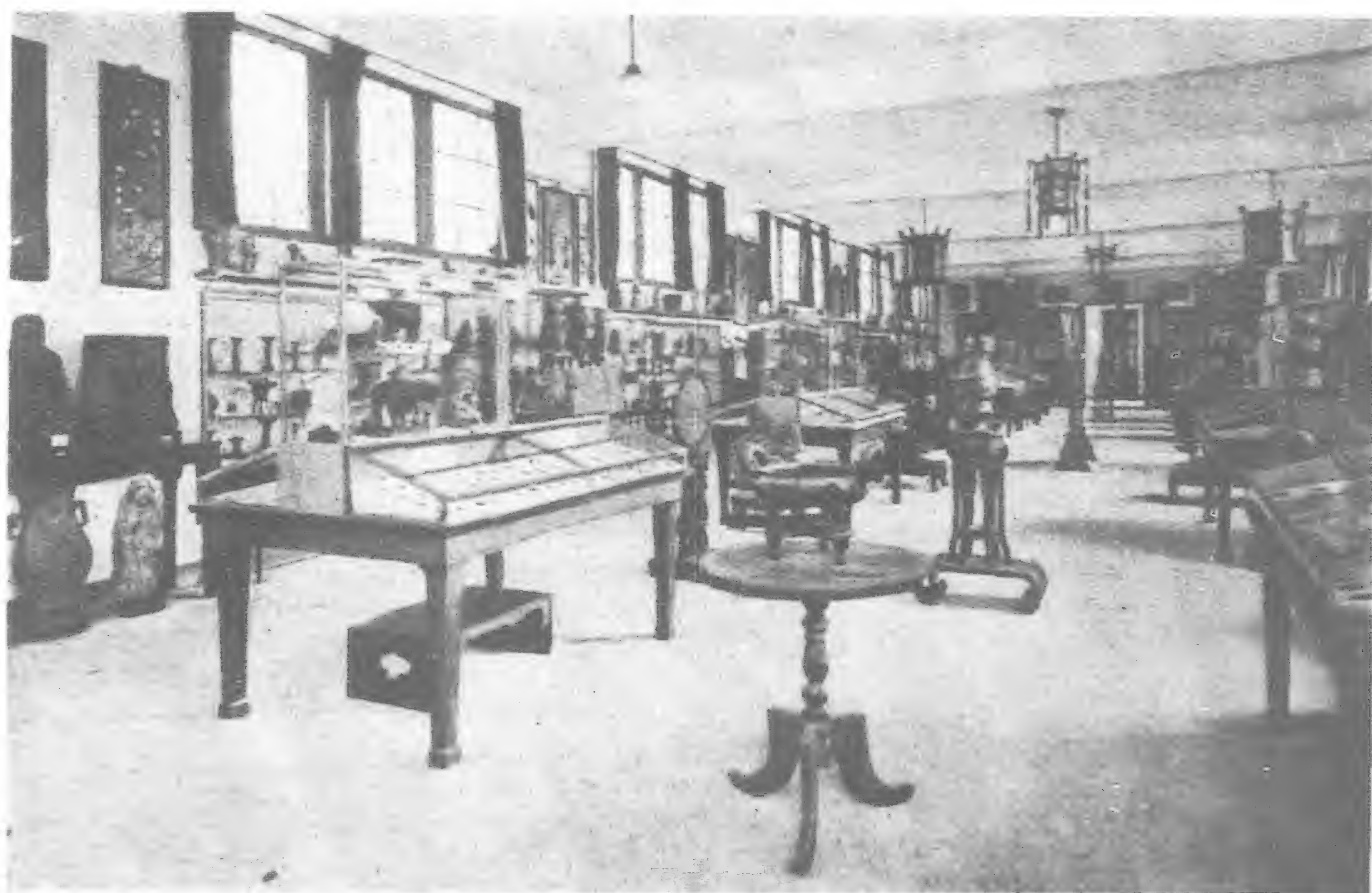
As soon as the war was over a new development commenced and new operating rooms were constructed, and then in 1921 rooms for the Radiological Service were added. In 1922 two buildings for women patients were constructed with the financial assistance of the French Municipality. In 1925 a laboratory was

added and in 1927 the older buildings were enlarged. Finally, in 1930 a building for prisoners and the magnificent Isolation building were added to the now imposing group.

In October, 1933, foundations were laid for a large four-storied building destined for poor men. This building now completed and in full service contains 300 beds. Here also have been installed, according to the most modern principles, Services of Surgery, Medicine, Ophtalmology and Otorhino-laryngology. Another small building, begun at the same time as this latter, contains a receiving station for accident cases, the Dental Clinic and lodging for the interns.

These new buildings would not have been possible were it not for the generosity of the Caisse des Oeuvres of the French Concession, which is always anxious to improve sanitary conditions for the Chinese poor.

It is interesting to note that since the foundation of the hospital the number of beds has grown from 50 to 700 and that of this number 400 are reserved for the poor.



Chamber containing collections of antiquities, 3,500 items, in the Heude Museum



For the year 1932-1933 the activity of St. Mary's Hospital may be summarized as follows:

Patients cared for	7,081
Days of sickness	122,880
Consultations at the dispensary	37,907
Births at the maternity	472
Operations	1,164
X-Rays	1,021

If the Faculty of Medicine of Aurora enjoys an unquestionable prestige throughout China, it is due not only to the teaching of the professors, doctors and surgeons, but also to the splendid installations of St. Mary's Hospital, of which the students daily avail themselves.

Aurora offers to its best students, once they have obtained their degree of Doctor of Medicine, the opportunity of one or two years' service or internship at St. Mary's Hospital. The principal aim of this custom is to give to young doctors the chance to increase their clinical knowledge before they go into private practice. The candidates for the internship are chosen by the professors, the Directors of Aurora, and of the hospital.

### Aurora Doctors in China

From the establishment of the Faculty of Medicine until 1934, 89 students have received their degree of Doctor of Medicine. Aurora has always been very strict in admitting its students to the degree of Doctor. About one-third of those who commence their Pre-medical course reach the final goal, after having successfully passed the examinations for the different certificates and the final examination.

This rigorous selection, which has at times given Aurora the reputation for excessive severity, has also been responsible for the success of the Faculty. The 89 doctors scattered throughout 12 provinces of China and abroad bring credit to the education they have received and pass for excellent doctors. The President of the Association of Practitioners of Shanghai has for a long time been an Auroran. Dr. Sung Kuo-ping, actual Professor of Semeiology at Aurora. This same doctor has made a name for himself in China by his work on medical nomenclature, and his dictionaries of medical terms are used as authorities on the subject.

### Department of Dentistry

This department is of recent origin. On October 20, 1933, Dr. Le Goaer, Dentist of the Ecole de Stomatologie of Paris, inaugurated the Dental Clinic of Aurora and began his courses. The course is a four-year one. Students who have their Premedical Certificate are admitted to the third year of Dentistry. Those who possess their degree of Doctor of Medicine may prepare for the degree of Dentist in two or three semesters.

### Faculty of Sciences

The Faculty of Sciences is as old as Aurora itself. It is true that in the beginning it bore but the modest name of "Course of Sciences"; but the first catalogue of the University, dated 1905, put forth a rather comprehensive program in Physics, Chemistry and Mathematics.

Until 1908 the course remained rather elementary and was not orientated towards specialization. Laboratory work was not omitted, it is true, but no really technical work was given to prepare directly for the career of engineer.

In 1909, Fr. Allain formulated a program which has served as a model for all ensuing programs. Three years of scientific studies and an examination entitle the student to the degree of Licentiate in Science. After this, a series of technical courses, called "complementary courses" and consisting of applied mechanics, resistance of materials, hydraulics, railways, electricity, industrial chemistry, result in the degree of Engineer at the end of two years of study.

Thus, from this period on, while organizing the scientific instruction, which is university work properly so called, Aurora has striven to satisfy the immediate needs of China to-day by forming technicians.

This program, completed in 1922, remains the same to-day in its general outlines. The technical section, in 1916, took the name of "Civil Engineering," the courses in pure science being

developed as far as possible, but the double conception which governed the program of 1909 still prevails: preparation on the one hand for the Licentiate in Science and on the other for the degree of Civil Engineer.

The modifications introduced in 1933 and which have produced the present Faculty of Sciences is inspired by the same ideal. If the courses tend to greater specialization of the students in four distinct sections, there is no desire to sacrifice the general scientific formation. The spirit which inspires them is the following:

First of all, to give the students a general enough knowledge to open their minds to the modern scientific problems and to give them a very solid foundation for the special studies which they will choose later on.

Next, to direct them in a special branch which will make them truly competent in certain matters, so that they may afterwards undertake other studies or special enterprises.

Thus, a two-fold excess is avoided: the study of too many different subjects so that none is solidly acquired; or else, on the contrary, a too rapid specialization, or in a far too narrow way, which confines the scientific mind or prepares only for a limited number of positions, which would perhaps be rather difficult to find in a country like China, where specialized industries are not yet very numerous.

Quite evidently, this program necessitates many laboratories and requires a costly scientific equipment. This was foreseen from the beginning and the scientific equipment of the Faculty has developed according to a methodic program.

In 1916, physics and chemistry, which had been taught in the same place, were henceforth to have their respective buildings. In 1919, a new building was constructed for electricity and mechanics, at the same time as new locations were set apart for work in architecture and industrial drawing.

Laboratories for thermic machines, gas engines, the technology of machines, the resistance of materials were gradually installed and now laboratories are being opened for photometry, with dark-rooms and light-rooms for the very delicate study of the lighting of modern buildings.

Thus, it is by a persevering effort and in a remarkable unanimity of purpose that in 30 years the Faculty of Sciences of Aurora has developed and has gained its present reputation for seriousness and thoroughness which is its best guarantee for the future.

### Organization of Faculty

The Faculty of Sciences comprises four Sections:

- 1.—Mathematical and physical sciences.
- 2.—Electrical and mechanical engineering.
- 3.—Structural engineering.
- 4.—Chemical engineering.

The course is a four-year course in each section, but the civil and electrical engineers, in order to enter the first year, must have finished the first year of the mathematical section or show proof of an equivalent training.

The section of physical and mathematical sciences leads to the degree of Licentiate in Sciences. It is designed for those for whom a profound knowledge of mathematics is necessary and who wish later on to specialize as professors or in scientific research. Astronomical observatories, bureaus of geodesy, laboratories, etc., have often offered positions to the "Licenciés" from Aurora.

The other sections give degrees in engineering which open the doors to various industrial enterprises: Chemical factories, central electrical works, the administration of railways and mines.

### Letters and Philosophy

Although Aurora has at present properly speaking, no faculty of letters, the teaching of letters and philosophy is by no means neglected. One can see in the history of the University that these subjects have always held an important place on the programs. Aurora does not aspire to the formation of technicians, but to giving its students as general and as classical a training as possible, and this is the reason why courses in literature and philosophy have been added to the program of the three Faculties.

The courses of Chinese Literature are obligatory in all the Faculties. It is most assuredly necessary for the Chinese student, whether he be an engineer, a lawyer or a doctor, to know not



only the masterpieces of his "National Literature," but also to be conversant with the "Modern Style." Exercises in literary composition, and for the Law Faculty exercises in the translation of legal texts, have for their aim the giving the student that grace of style which is so difficult to acquire.

This point deserves special mention, because Aurora is not at all in favor of the unfortunate modern tendency which would bring the Chinese Classics into neglect in favor of a purely Western culture.

Of equal obligation are the courses in French Literature. A thorough knowledge of French being necessary for the students in order that they may follow their courses, read present day reviews and special works, nothing could be more suitable to train them in a knowledge of that language than the study of the great French literary masterpieces.

The study of French Literature has been divided into three years, consisting of the reading and explanation of the great authors of the 17th, 18th and 19th centuries.

The courses in English, obligatory for the students of Law, are strongly recommended to the students of the other Faculties. Given by specialists, usually American Fathers, they are attended by a large number of students. Practically, the young Aurora graduate is able to speak English fluently enough to enable him to take a position in any English or American concern.

Philosophy is not only a science, it concerns all sciences and every form of human activity. Thus, the most distinguished savants agree in esteeming it indispensable, along with literary culture, for all those who wish to engage in deep and fruitful scientific work. Without literary culture, a learned man is unable to communicate his learning; without philosophy he cannot understand completely the object of his studies, nor connect them with other branches of learning.

### The Heude Museum

The fame of the Heude Museum of Natural History, which is a part of Aurora University, is world known, and the Museum of Chinese Antiquities, connected with it also is altogether notable. The Heude Museum now housed in its own modern building on Avenue Dubail grew from the collections of the celebrated Jesuit scholar, the Rev. Father Heude.

Some collections of natural history were indeed assembled at Zikawei before the arrival of Fr. Heude in Shanghai on January 9, 1868. But it is only since that date that the Museum really began its existence.

The Father immediately began his explorations in the interior of China, concentrating his efforts in a special manner to the valley and the affluents of the Yangtzekiang, bringing back from these expeditions numerous and precious collections which have been completed gradually by Fr. Heude himself and his successors, notably Fr. Courtois. They were housed for a long time at Zikawei in a building built for this purpose in 1883. In 1930, the work having been entrusted to Aurora, a building was constructed on Avenue Dubail which is much larger than the old one and is perfectly organized for the work. It is a three story structure, with exhibition rooms, study rooms, laboratories, and libraries, the whole ensemble forming the Heude Museum and the Research Institute. It is, without doubt, the richest Museum in the Far East in specimens

of the fauna and flora of the vast Chinese Republic. It also contains specimens from Japan, the Philippines, Indo-China, Siam, the Moluccas and Malaysia. The founder of the Museum passed the last fifteen years of his life in exploring these distant regions and in procuring the most superb collection of Mammifers imaginable.

The Research Institute has already become a famous center where numerous savants of all nationalities come to work at their specialty. To those who cannot come to the Museum, choice specimens are sent even to foreign countries, thus permitting material which up to the present has never been studied to take on a new value.

To facilitate the research work, a mural map outlines the explorations of Fr. Heude and shows the principal centers of all the specimens of the Museum. This gives at a glance an idea of the territory already explored as well as that which for some reason or other has not yet been covered. The present staff of the Museum proposes to undertake further researches in the valley of the Yangtzekiang. Thus there will be developed a regional Museum representing as exactly as possible the fauna and flora of the provinces watered by that great river.

Some of the collections are still incomplete merely because no one has yet undertaken to study them, while many are complete and others almost so. A general inventory has been begun but is not yet finished.

### The Museum of Chinese Antiquities

In keeping with its purpose of striving against the present exaggerations which wish to do away with much that is ancient in the culture and tradition of China, Aurora, while training jurists, doctors and engineers, wishes also to form men who will be deeply in love with the grandeurs of a glorious past.

As nothing can impart this love better than object lessons, Aurora students find as illustration of their lectures a beautiful collection of Chinese antiquities. Thus it becomes easy for them to place in their proper surroundings, and to make relive again in their imaginations, ancient China or modern China of the Empire.

The collection of Chinese antiquities was added to the Museum in 1929. It came from Zikawei, where Brother Beck had gathered together little by little all the ancient objects sent him by missionaries.

This collection contains nearly 3,500 pieces of all styles, from the dynasty of the Shang (1766-1401 B.C.) down to our own day.

It is impossible in a brief sketch like this to give all the objects of Chinese art in the collections. We content ourselves with a word here about the carved wood, the lacquer of Fukien, the various screens, the jade-embossed panels, the lacquer shades, the silk, the storied porcelain and countless others.

Finally, in a glass case there is to be found the mannikin of a Mandarin named Huang, who died in 1694, which was found in 1917 in a state of perfect preservation at Tsongming. The clothes and objects exposed are all authentic: robe, boots, necklace, lamp, etc.

The skirt is that of his wife, buried by the side of her husband. Her body was also found incorrupt. The heirs, fearing lest the spirits take revenge upon them for the desecration of their tombs, cut the two corpses into three pieces and threw them into the canal. The two knives used for this purpose can be seen in the case.

## CHINA IN AUTUMN

(Continued from page 426)

(2) Extension of the Kiaochow-Tsinan Railway to Shunteh, on the Peiping-Hankow Railway, thus reaching into the inner part of Hopei and Shantung.

(3) Extension of the Peiping-Suiyuan Railway to Chihfung, in Jehol, passing Kalgan and Dolonor.

Plans are also on foot to dredge the Yellow River and Yungting River, and to dredge Tangku and Taku harbors. When these dredging operations have been completed, ships up to 5,000 tons will be able to enter the former port and up to 8,000 tons at the latter. A survey has also been completed for dredging the Taku River between Taku and Tientsin, which when consummated, will enable ships of 5,000 tons to reach Tientsin.

The development of natural resources in North China will be largely under the direction of the Hsing Chung Company, which is a

subsidiary of the South Manchuria Railway Company, the latter supporting the Hsing Chung Company with its technical staff. The Hsin Chung Company has a capital of \$10,000,000. The first objective of the new company is the tapping of coal and iron mines. It is estimated that in Shansi province alone there is an available supply of more than twelve million tons of coal, of which about one-quarter is anthracite. The iron ore deposit in Chahar, Hopei, Shantung and the Yangtze Valley are estimated at more than 250,000,000 tons. Plans are also on foot to extend the Lungyen Iron Foundry, the South Manchuria Railway having furnished \$5,000,000 for the purpose. A Sino-Japanese company with a capital of \$1,700,000 has likewise been formed (with the approval of the Nanking Government) for the exploitation of gold mines in Chaoyen and Langlung.—val.



# The Yellow River Dike Breaks of 1935

By O. J. TODD, Consulting Engineer, China International Famine Relief Commission, Secretary of the Association of Chinese and American Engineers

THE cycle of wet years through which we are passing in North China has resulted in two major floods on the Yellow River. The first was in August, 1933, when a maximum discharge of 750,000 sec.ft. or 22,000 cu.m. per sec. (in round figures) passed the Honan-Hopei border. The second was in July, 1935, and was estimated at 500,000 sec.ft. or 14,000 cu.m. per sec. at maximum height at this same location. The nature of these crest floods, the condition of the scouring river bed, and the spilling out through accompanying dike breaches, made accurate measurements of these peak flows impossible. They were the largest floods recorded on the Yellow River during this century and there are no reliable records to be found throughout history of a greater flood on this section of the river than that of 1933 which brought an excessive mud load to be deposited along the bed of the lower river, particularly from the Peiping-Hankow Railway bridge to the old Grand Canal crossing. It is in this 350 km. of river passing through hill-less plains that most of the dike breaches are to be found.

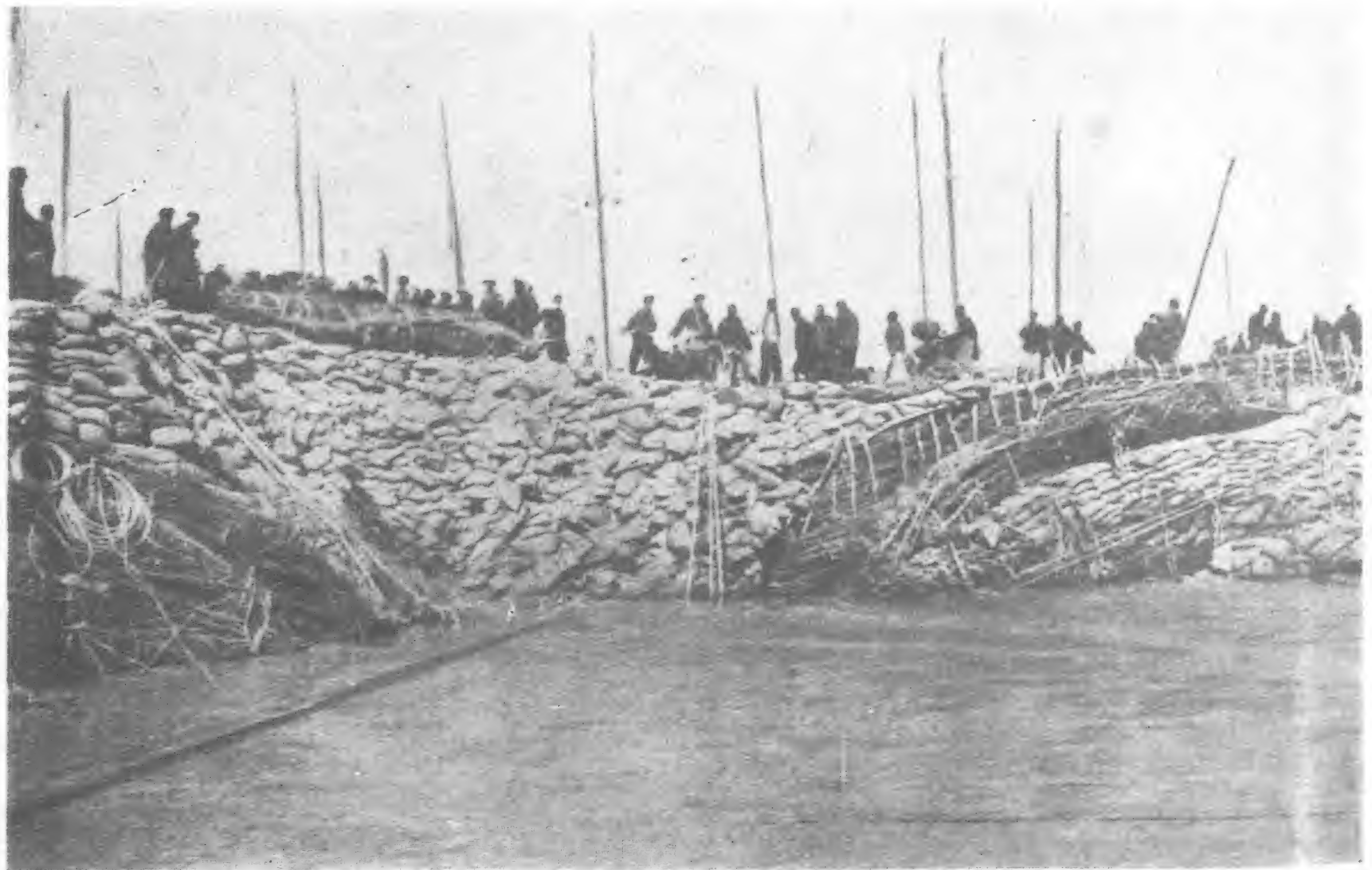
So, after the breaches in the north dikes at Feng Lo, South Hopei, in 1933 and another breach 40 km. up stream on this same north dike near Kwan Tai the following summer, further breaches were to be expected unless the greatest precautions were taken in the matter of control works, which means, in these circumstances, dike raising, enlarging and revetting, or protecting by spur dikes and groins, as local conditions may demand. Having sat on the National Board of Engineers called in October, 1933, to devise methods for repairing the Yellow River dike breaches of that year, and having visited the break at Kwan Tai in late February of last year, I became convinced that a situation had arisen that endangered the North China Plain and then gave distinct warning regarding the safety of Tientsin, for I felt we were still in a wet cycle as far as North China was concerned. In a short talk on the Yellow River given before the Waterways Section of the Annual Meeting of the American Society of Civil Engineers in Los Angeles on July 4, 1935, I called attention to the likelihood of further dike breaks on this section of the Yellow River in case of a high summer stage. The crest flood that came a week later was no surprise to those river engineers who had carefully watched developments for the two previous years. It has been said that better dike patrol along the Shantung section would have prevented the flood of last July. This, however, is not at all certain unless we assume that with such patrol goes the supply of stone, willow facine and kaoliang required to quickly revet eroding banks. That the patrolling was not adequate must be admitted by all. However, it also seems certain that, while the Golden Dike was made stronger and given adequate protection for the time to guard against a break to the north that might threaten Tientsin, there was not enough extra work done on the south Shantung dikes to furnish what Americans would consider a suitable "factor of safety." Many sad experiences through the past century have taught those in charge of the Mississippi River dikes a similar lesson. If we are to depend on a diking system in the main for flood control, then this system must be developed on

a generous scale with ample revetting supplies, broad and high dikes of good material, and constant patrol by experienced river men.

Yellow River floods, accompanied by dike breaks, have been frequent throughout recorded history. They have varied greatly in their intensity depending on a number of conditions. At times only a portion of the river's flow leaves the main channel. At other times the whole river leaves its bed and starts across country. The flood of July, 1935, belongs in the latter category, for by late autumn little flow was found down the thread of the old stream, and before the end of the year no flow at all remained there.

In 1922 this river left its old bed entirely near Litsin in eastern Shantung, and was reverted to its former bed by semi-foreign methods planned after studying the work on the lower Colorado River, and successfully carried out by a mixed staff under my direction. The last time that Chinese methods of control had been tried, when the entire river was out of its bed and on a rampage, was in 1887-88 in Honan west of Kaifeng. Here the ancient methods prevailed and, under favorable winter working conditions, the river was again put under control and back in its old channel. Nearly forty years before that, in 1851, the river had broken through its northern dikes at a point thirty miles east of Kaifeng, but this time attempts at control through the old channel failed so that the river left its old course which it had been following for five centuries to the Yellow Sea and scoured out for itself the general course that it now takes to the Gulf of Chihli, following a north-easterly direction from near Lanfeng, Honan.

As heretofore noted, the discharge of the Yellow River in July, 1935, in western Shantung, was the greatest recorded in the past four decades except for that of the summer of 1933 which was 50 per cent greater at maximum height. The heavy mud load brought down from the hills of Kansu, Shensi and Shansi by the flood flow of August, 1933, had raised the bed of the Yellow River near the old dike breaks of 1851 in eastern Honan and to the east of that into Shantung Province. So, as has often happened along the Mississippi River, the dikes were not high enough to stand the new flood, and on July 10 they gave way near Linpaochi, Shantung, burying that town of 5,000 inhabitants under a silt



View from the up stream side showing loading of the closure section with bags of earth, March 28, 1936



deposit of eight feet depth, the lower points in the town getting ten feet of concentrated mud. Now only the taller houses that were made of good brick masonry project above the level of the newly built plain. The other buildings are buried to the roofs or entirely destroyed. So it happened to many villages nearby that lay in the path of this mud laden flood as it passed through breaches in the dikes a mile and a half in extent and flowed across country, to the south-east paralleling the Grand Canal into Kiangsu Province, and then east to the Yellow Sea near the old river mouth as it was located before 1851. Such is the power of this river to carry a mud load and rapidly change the terrain by digging up here a new channel and filling in depressed areas there, silting up old river beds in a few days, and burying villages by the dozen under a load of mud so heavy that the ruins are scarcely worth digging out.

If one studies the map of this section of the river prepared by Mr. John R. Freeman during the Grand Canal surveys of 1919-20, he will note their records for centuries past show many difficulties with dike breaks, but in no place are shown records of such heavy silt deposits over a large area as have occurred in the Linpaochi section following this 1935 flood. In this respect this flood has been unique for this country, at least. It is likely that the maximum mud load in this flood ran as high as 25 per cent solids by weight compared with about 30 per cent obtained in samples taken during the maximum flow of the August, 1933, flood above the Peiping-Hankow Railway bridge, though at the break it was below 10 per cent.

The farm lands covered by this flood during September and October have been estimated to total 6,000 sq.m., about half of which area was in Shantung and the other half in Kiangsu Province. Between 4,000,000 and 5,000,000 people were thus directly affected. The crop losses and the destruction of villages and attendant losses due to this flood have been estimated at a total of over \$240,000,000 Chinese currency (U.S. \$75,000,000). Most of this loss is sustained by about 2,000,000 people or an average of \$120 per capita. A loss per family of \$600 silver means a heavy burden to a region of small resources where earnings are small. This problem of flood control, therefore, is one of urgency from a standpoint of social service as well as a most interesting problem to the river engineer who finds the Yellow River most fascinating as a great outdoor laboratory for the study of the science of hydraulics in some of its most intricate aspects where one deals with easily eroded beds and banks and finds quantities of silt in suspension of such fineness that the question of critical velocities becomes an important one. The last



Construction boat used for handling ropes in extending kaoliang pak work into deep water, February 29, 1936

word on this point has not been said for Asia despite careful observations made years ago in India. The Yellow River has characteristics of its own due to this heavy silt load which it brings down year after year.

To the near-by communities affected the problem of regimentation or control along radically new lines is not attractive. They desire that the flow be returned to the old channel and kept off from their lands. Most of them would not object to having a new channel established on the opposite side of the old river course, but they do not wish it moved their way. And at present the State has little option in the matter. The peasantry rules on these matters to a great degree. So the engineers are asked to put the river under control, which means for the time, at least, putting it back where it was by a process of reversion, either old or modern or a hybrid of the two.

The plan adopted last autumn for putting the river back into its old channel was to rebuild the old dike much stronger than before, protect it with four new spur dikes after improving the old spur dikes immediately up river and then carry this main dike across the flowing river where it has breached the former inner dike. This was no easy task, yet it was accomplished in four months including the winter period when ice conditions delayed work and days were short.

As an auxiliary to this closure dike, a cut-off channel was located half a mile up stream to relieve the head against the new dike as final closure was near, and to act as a "primer" for getting flow started down the old channel bed to induce scour. By cutting off a long bend in the river this new cut-off channel was given a gradient of 1:4,000 while the old channel had a gradient of 1:10,000. Though this channel was limited to 15 m. bottom width and 45 m. top width due to difficulty in excavating through frozen ground and the short period remaining before putting this cut-off into service, its opening on March 20, was a distinct aid in getting scour started in the old river bed below its down stream end thus permitting the old channel bed above that point to rapidly cut back and soon take a rapidly increasing flow. In fact a week later at time of closure the old channel bed was taking five times as much flow as the cut-off channel. This was due to its width and the fact that the silt in its bed was easily erodable being very light material, as a rule, that was laid down as the flood of last summer was receding, and with slackening velocities only the lightest silt finally was carried down to be deposited here. This new top bed silt scours out at a lower velocity than the old silt that was found in the bed



Making willow fascines 50 feet long, March 10, 1936





Linpaochi, Shantung, after the flood, December 4, 1935, with the silt 6 to 8-ft. deep

of the newly excavated cut-off channel where the super-imposed earth load had for years been ten feet or more in depth thus compressing the soil into less easily eroded layers much as we find well tamped or flapped dikes compared with dikes of loosely piled earth that has not been properly compressed.

Further studies yet to be made will likely prove that in that finer silt deposited last autumn, and at similar periods of flow, in the old river bed the critical velocity may be somewhat less than that found by Kennedy in India. In fact the velocities at which deposition stops and scour begins will be found more nearly identical than in the case of the newly dug channel through old ground where the compression has been well advanced by an overload of at least ten feet of soil for a number of years.

Since the closure point was chosen immediately opposite a rather sharp bend in the river, four short channels were cut across this point before getting to the main cut-off channel that crossed both this point and the long bend beyond. These four minor channels helped the river wear down this point as closure proceeded, thus drawing the main current farther away from the new work.

Two plans had been suggested for closure in handling this reversion work. One included a much wider, though shorter, cut-off channel starting at a point half a mile or more below the closure selected with a closure dike below that. It aimed on taking the entire low water flow through this wide cut-off channel and at the same time keeping the head against the new work down to a maximum of not over four feet. With this plan the middle section of the closure dike, just below this point, would have been a trestle from which a rock hill dam would have been built. The rest of the work would have been much as has been followed on the plan adopted. Due to water conditions and the delay that would be caused by waiting for the ice jam to leave before piling could be driven, this was rejected for the plan that was carried out and which made use of the old river bed as the main channel to carry the flow as closure proceeded. Also the trestle was omitted and the "contraction" method adopted as fitting in better with the circumstances where much hand labor was available with "river police" organizations from two provinces who were skilled in the "contraction" method. It was for this reason, and to get the work done ahead of the "spring freshet," that Chairman H. Y. Kung of the Yellow River Conservancy Commission chose this plan. But with it he brought certain modern improvements which he had worked out in the two previous years at Feng Lo and Kwan Tai. One was the liberal use of stone paving laid on willow mattresses to protect the up stream face of the closure dike. The other was the use of long willow-stone

"sausages" to fill in the final gap of the closure where velocities were high.

The work of rebuilding the main dikes and repairing the spur dikes near Tungchuang had been started by the Shantung Reconstruction Bureau in late October, and the shipment of materials was well along when the work was placed in the hands of the Yellow River Conservancy Commission in mid-December, Mr. Kung taking charge as Chief Engineer. In spite of severe ice conditions that held back the work, closure was effected on the main dike on March 27 and on the secondary dike April 5. The third, or "moon dike," below that, to handle all accumulated leakage and form a large pond 1,000-ft. across to raise the tail water and induce more rapid silting, was completed April 7. This seems a record in rapid work under difficult circumstances where a major dike break was being handled and the entire river had left its main bed and been passing through this break.

Some of the details of construction employed on this work will be of interest to those river engineers who have not had the privilege of watching this "contraction" method carried through against a flow of 500 to 900 cu.m. per sec., as was the case in this instance. To the foreign engineer it at first seems hazardous, yet a careful observation of the method shows that it works well under favorable conditions, and when suitable precautions are taken by the engineers in charge. It is strictly a hand labor method and utilizes large numbers of workmen with simple tools and native produced materials of construction on the whole.

First the two ends of the closure dike adopted are carefully built up commencing well back of all new breaks along the old alignment. After consultation with the oldest river hands a point of closure is chosen that rests on clay rather than sand beds, it being well known that alternate layers of sand or silt and clay are to be found in varying thickness of strata all along the lower Yellow River.

After the location was determined the north end of the old inner dike was fixed at the village of Lishengtun by the use of heavy stone revetment so that the eroding currents could not cut it back farther, as the new channel passing through the breach hugged that bank. The south-west end of the closure dike was then advanced to within 834 m. of that point, this work being entirely of earth forming a dike 15 m. wide on top with side slopes of one on three. The Kiangsu Pa or spur dike, with its accompanying shorter dikes near Tungchuang, protect this base dike, and beyond that to the east four more spur dikes were built out at an angle of about 45 degrees sloping down stream to give further protection



Many hemp ropes tie the kaoliang work back to the main closure dike as it advances into deep water, February 29, 1936



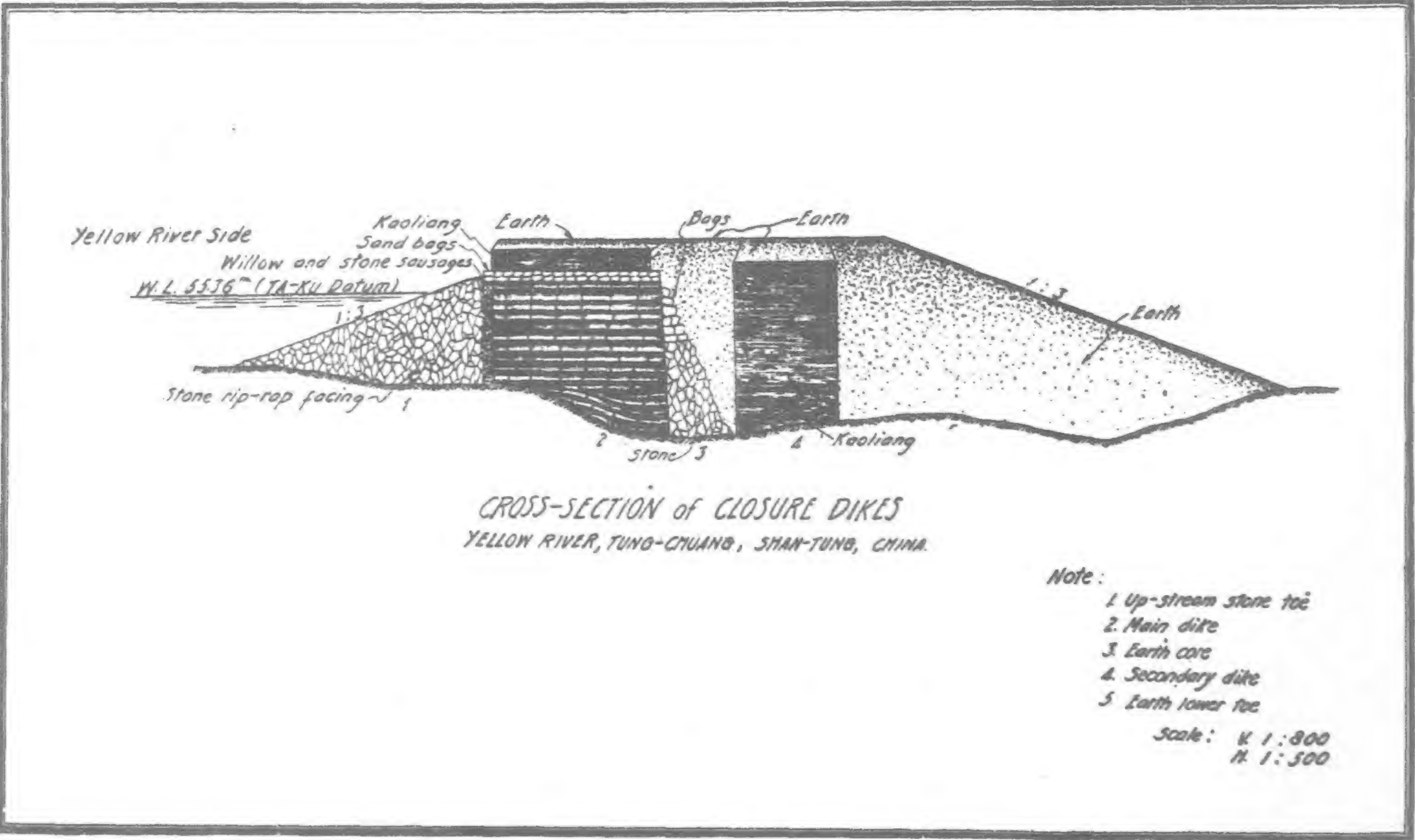
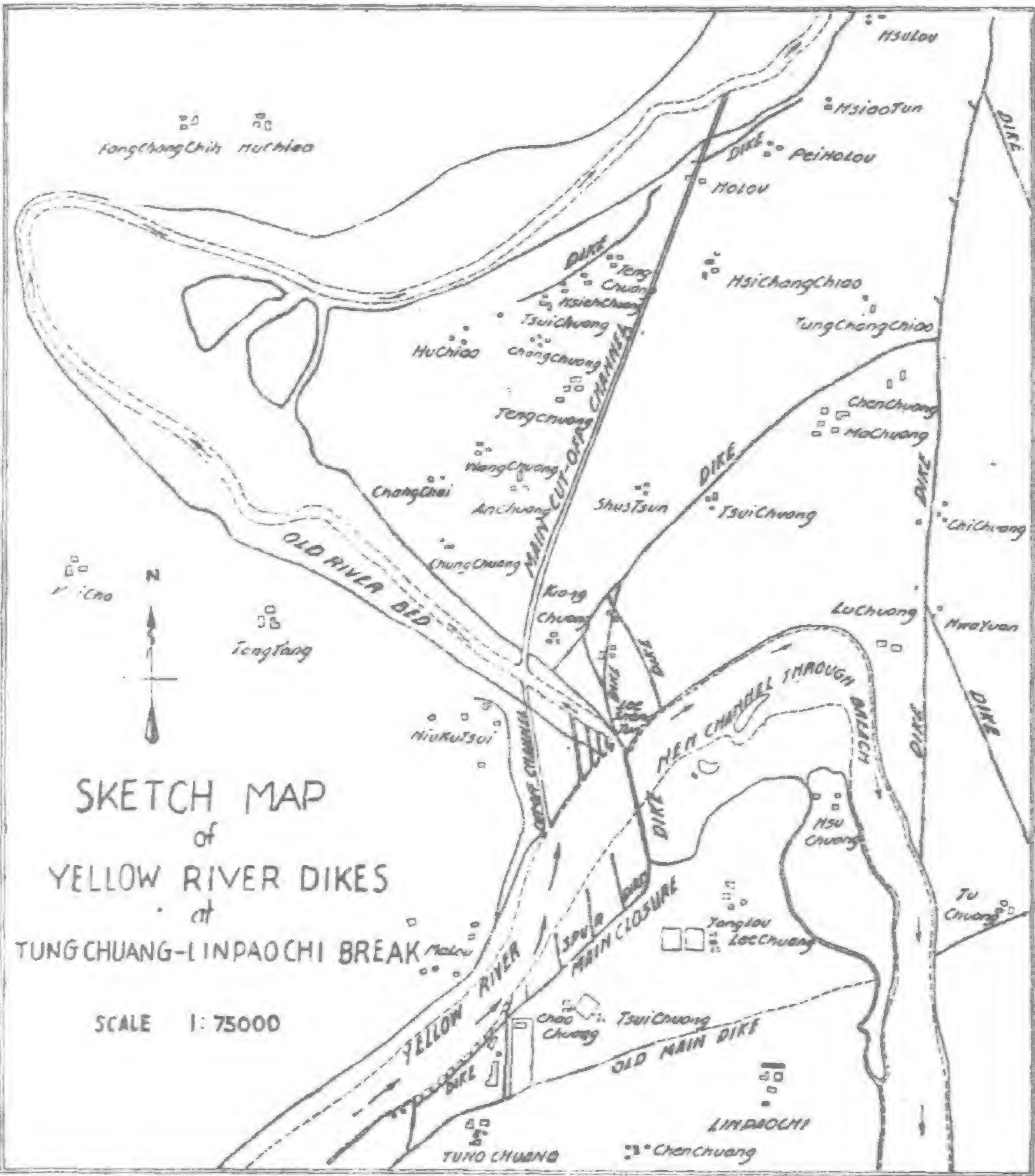
to this base earth dike. These latter dikes vary in length from 238 m. to 501 m., thus giving adequate protection. They are a meter lower in elevation than the base dike, are 10 m. wide on top and have side slopes of one on three. They have kaoliang stalk cores and are revetted at the farther end with stone rip-rap. All dikes when complete will be two meters above maximum flood marks.

Beyond these spur dikes the main base dike continues as a packed earth dike of ample width until the last section of 834 m. which, except for the final 39.5 m., has a broad kaoliang stalk core faced with a stone up stream toe laid on a woven wire willow facine mattress bound together with wire and fastened to the main dike with light cables made from twisting together three strands of No. 16 galvanized iron wire. The stone is laid on a slope of one on five in the dry sections but the outer end of the toe becomes steeper when building out into running water. The main kaoliang stalk core is 15 m. wide, is built with vertical sides with roots toward the up stream and down stream faces, and is thoroughly tied together by hemp rope 1½ to 2-in. in diameter made on the job. On the kaoliang layers compressed to about a meter depth, earth is wheeled to a depth of half a meter or less according to the weight

required to sink the mass when pushing out into the river. Just back of this kaoliang core is built an all-earth fill 10 m. wide on top with slope of one on three on down stream face. The main core usually carries an earth cover of one meter depth, but always a half meter is cut away from the up stream face to make room for butt ends of kaoliang stalk as a facing for the dike to prevent cutting by water at high stages.

Aside from the ropes that are used as a cradle to support the kaoliang as it is being put in place over the working end of the dike core, other long ropes are used outside of each 5 or 10 m. section to act as a great belt or breast strap to hold the last laid work firmly against the work immediately back of it. These long ropes so employed are anchored well back along the kaoliang core tying it together so it becomes part of a continuous structure.

This type of work is well suited to hand labor methods where wages are but 10 cents. to 15 cents. U.S. currency per day and for centuries similar methods have been used, aside from the more recent improvements herein noted. But everywhere local materials are employed as a rule and hand labor is used rather than machinery. The local materials are earth (silt and clay), stone, kaoliang stalks,





willow branches and stakes, and hemp. Large jute bags to be filled with earth for use in currents, and iron wire, are the chief imported materials. Willow branches are used for facine work and for mattresses under the stone facing to hold same in place, while straight pieces from 2-in. to 5-in. in diameter are used by the thousand as stakes for tying the kaoliang paks together and then to snub back the long ropes that hold the paks in place. These kaoliang stalks average about 3 m. in length and are always used with roots on though the seed head has been removed. These stalks are similar to American corn stalks or southern cane. When packed tightly in place in cradles of 40 to 50 hemp ropes of  $1\frac{1}{2}$  to 2-in. diameter, with a thousand workmen jumping up and down on section 15 m. or more wide by 10 m. long, they settle rapidly into water and soft mud and do good service in resisting erosion as the contraction of the breach goes forward.

The "river police" of Shantung and Hopei have become so expert in the use of these materials and methods that the work proceeds without any great difficulty even when advancing through water 10 m. or more in depth, until the remaining gap becomes so narrow that velocities of the water flowing through the breach become greatly increased and scouring becomes a serious concern. It is at this stage that the cut-off channel functions to advantage. The cut-off channel for this project had already been excavated by 20,000 workmen using picks, shovels, wheelbarrows and baskets with poles, through much of February and early March. When the entire river has left its bed, as was the case in this instance, then the old channel is badly silted up and the new cut-off channel must act as a "primer." This it did starting March 20 when the final section of 40 m. opening was well along and the willow stone "sausages" had been placed in sufficient numbers to cause "heading up" of nearly a meter. The opening of the cut-off channel at this time reduced the head at the closure work and induced flow in the direction of the old river bed and through the cut-off channel.

The filling in of the last 40 m. of the gap was done in a week by the use of 1,000 of these "sausages" varying in length from 5 to 15 m. These were rolled into the gap close to the approaching ends of the kaoliang core dike, part being built on the dike ends and part on long boats anchored in the gap and fitted with special working platforms on which the "sausages" were constructed and from which they were easily rolled into place. The water in this remaining opening was from 7 m. to 10 m. deep while this final closing work was going forward, and the flow through this narrow gap averaged about 500 cu.m. per sec. the first few days. This



Stone paving on up stream toe of closure dike showing willow mattress cover, March 13, 1936

was rapidly reduced as the gap decreased in width. This was the most urgent part of the closure work and proceeded night and day by having changes of selected crews, though this willow-stone "sausage" work was comparatively new to most of the river men.

The willow facines were made in a special work yard conveniently located near the river bank up stream so that boats could rapidly deliver these supplies to the job. In making these facines small willow branches less than an inch across at the butt were used. Each facine was tied at one meter intervals with No. 18 iron wire, each bundle or facine being from one dec. to two dec. in diameter. These were made at the yard the length of the "sausage" desired, and on reaching the job were laid close together parallel to the flow through the gap at the end of the dike or on the platform boats. After four or five of these were laid side by side to make the base of the "sausage," hemp ropes an inch in diameter, and spaced a meter apart, tied them together, and the long anchor rope was carefully tied through the center. Then stone was placed on this base to a height and width of half a meter. Other facines were then placed along the sides and top after which the ropes at the base were tied around the whole mass making a long willow cased body weighing three to five tons. The anchor rope was then carefully snubbed to heavy stakes set well back along the dike's up stream edge and the "sausage" was tumbled into the gap. In actual practice the swiftly flowing

water caused a number of these tie ropes to break and the "sausage" to be carried down stream 50 to 60 m. This was soon corrected by the use of two ropes each 2-in. in diameter, and, toward the last, four  $\frac{1}{4}$ -in. wire cables were used to insure safety of position against a head of nearly two meters that had then developed.

The final closure was thus a thrilling event effected by the "contraction" method against a head higher than had been encountered in other closure work in recent decades, at least. Immediately the last "sausage" was rolled in place and most of the flow was diverted back into the old river bed, hundreds of workmen rushed in bags of earth supported on a hastily constructed foundation of willow brush. Thus the main job of reverting the river was completed. Leakage was rather heavy for a few days until the load of sand bags and earth rapidly piled on top finally weighed down the willows filling many voids. More bags of each on both up stream and down stream faces were used in the work of waterproofing which was finally completed on April 5, when the secondary dike was closed and the space between the two dikes was filled with bags of earth and good clay. This space



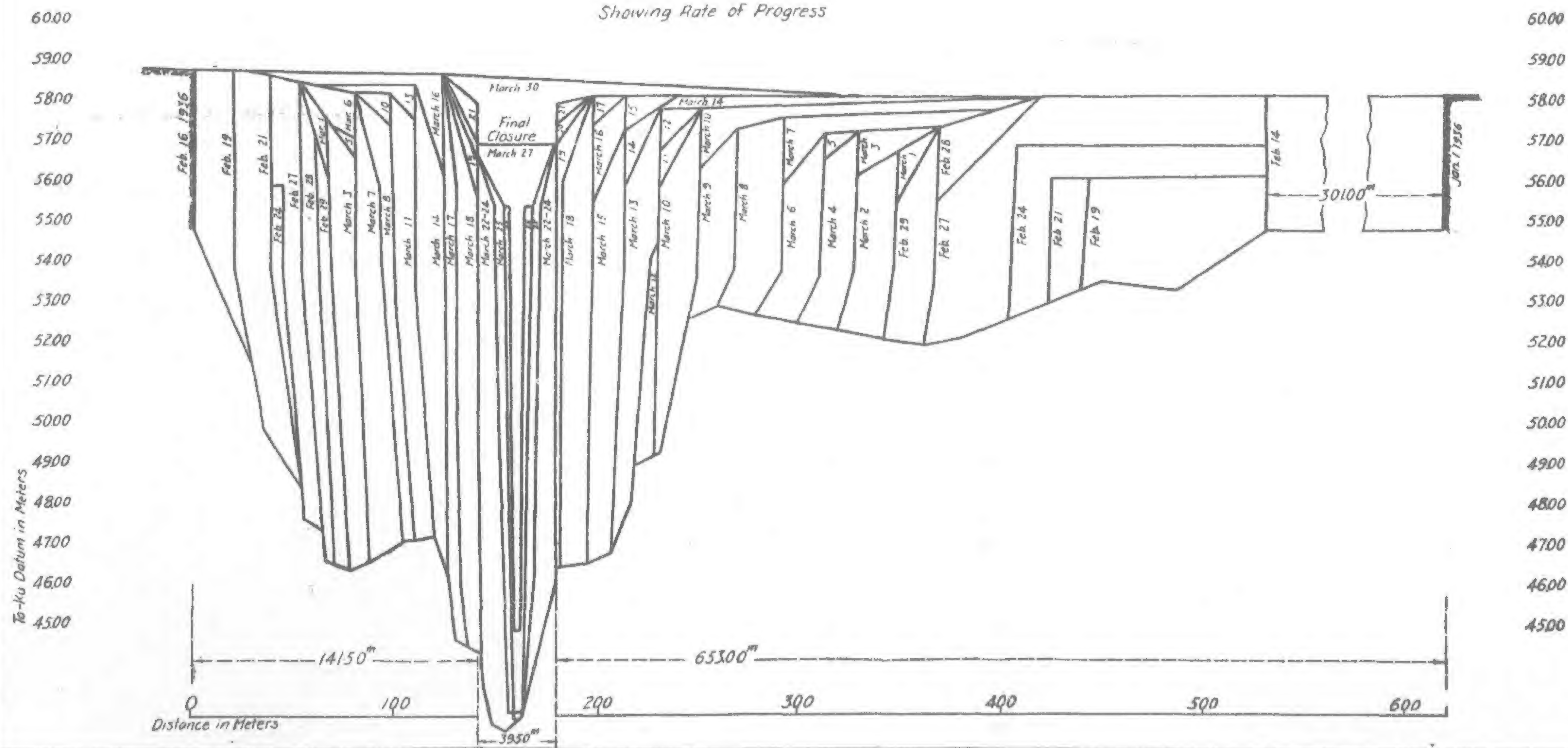
Getting the first stone "sausages" placed, March 21, 1936



# LONGITUDINAL SECTION OF CLOSURE DIKE

YELLOW RIVER TUNG CHUANG, SHAN TUNG, CHINA

Showing Rate of Progress





was about 15 m. across at the closure point. A further back-fill of earth on the down stream face of the secondary dike sealed off all remaining leakage of consequence. But as a further insurance and an aid toward silting up all voids a so-called "moon dike" was built with the center of the bow 300 m. below the closure. This enclosed a stilling pond that keeps the tail water well up so that silting can proceed more rapidly at the closure, and will take care of any "sand boils" that may appear.

Both the use of stone "sausages" and the stone rip-rap front-toe laid on willow mattresses and tied together by a willow cover are modern improvements over old Chinese methods and have been developed by Mr. H. Y. Kung who employed them

two years ago at Feng Lo and in repairing dike breaks a year ago at Kwan Tai. While these were major repair projects for reversion of a large portion of the river's flow, in neither case was the entire flow of the river out of the old bed as in the instance of the 1935 breaks at Linpaochi and Tungchuang. The work just completed at the latter break is the most difficult that has been carried out since we built the rock fill dam from a pile trestle at Kungchiapa near Litsin, Shantung, in 1923, following plans that it was my privilege to draw up at that time.

The cost of this project has been approximately \$2,400,000 Chinese currency (U.S. \$800,000) and has employed as high as 35,000 men at the peak of the excavation work in early March.



A thousand men help settle a new section of kaoliang pak work into the water, March 10, 1936



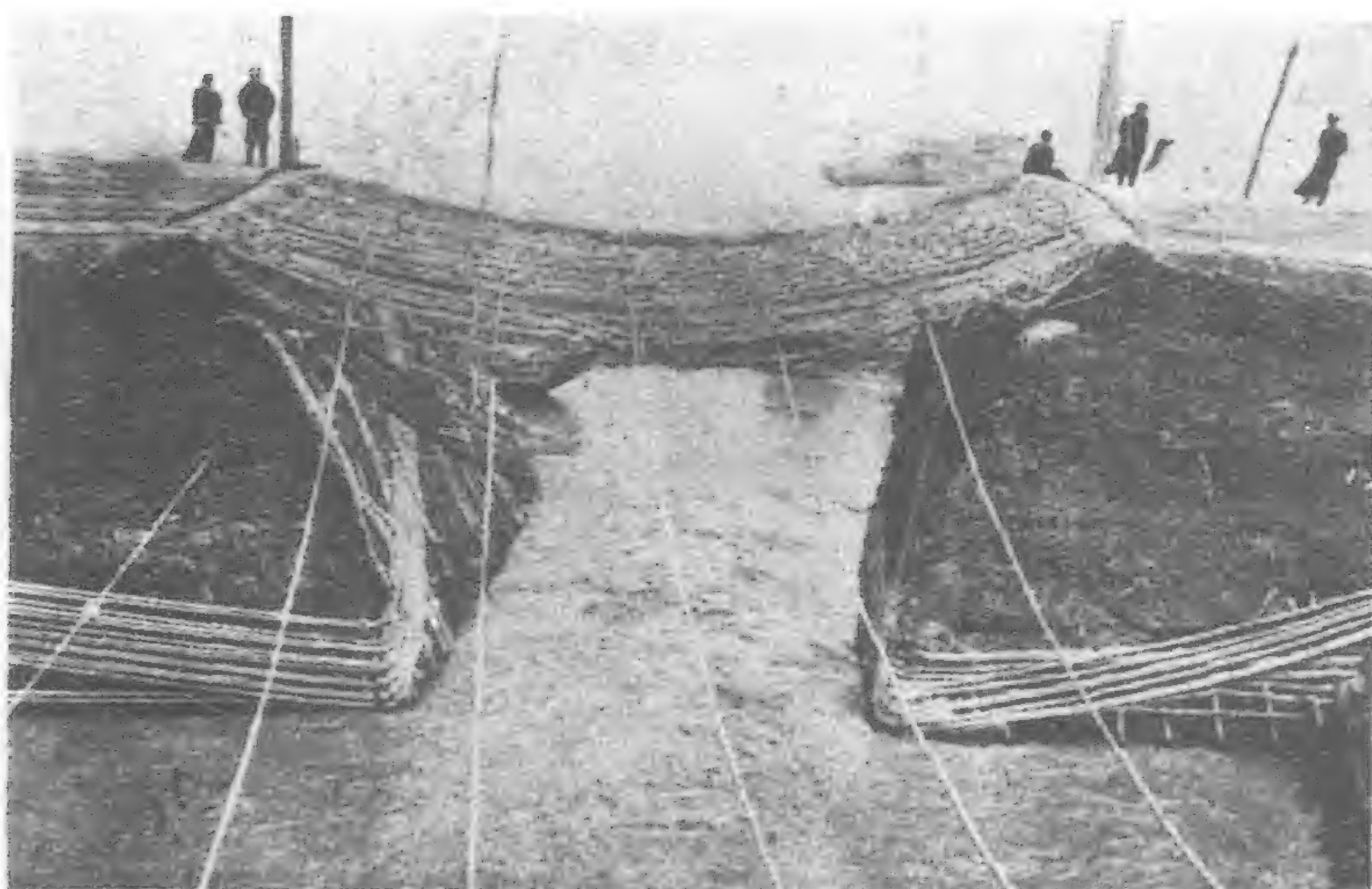
Kaoliang pak work being placed in deep water, March 10, 1936



Steel cables replace hemp rope to hold willow-stone "sausages" as heading up of nearly two meters makes swift water, March 27, 1936



Down stream view of the gap on the last day of closing, March 27, 1936



The "dragon's net" ready for closing the secondary dike, April 5, 1936



Building the plug to close the secondary dike, April 5, 1936, 5.15 p.m.



## FLOOD PICTURES FROM NORTHERN KIANGSU DISTRICTS



The village of Cha Lo surrounded by flood waters



In the Kao Yao Hu district pictured here many were drowned

The 40,000 cu.m. of stone used on this work came from long distances being shipped 160 km. by railway to Lanfeng where it was transferred to ox-carts and small dump cars pushed by hand over light railway 10 km. to the river bank, from which point it was carried by boats the last 100 km. As a rule only one-man size stones were used. 300,000 jute bags filled with silt or clay were used in the closure work. The dry kaoliang stalks used in the various dikes totalled 15,000 tons. 4,500 tons of willows were used in the facines and the mattresses used in connection with the stone toe. The hemp rope used totalled 1,000 tons while the galvanized iron wire from America that went into this job came to 2,000 tons. 90,000 willow stakes were used to tie the kaoliang work together and anchor the various ropes and wires throughout construction. The earthwork in the dike construction totalled 700,000 cu.m., while the cut-off channel entailed the hand excavation of 550,000 cu.m. of clay and silt.

The machinery employed on this work consisted of two small centrifugal pumps with gas engines attached, capable of delivering 3-in. streams, used in connection with the excavation work on the cut-off channel, plus 3 km. of light railway and a hundred light dump cars for transfer of clay and bags of earth. Most of the

local transport was done by wheelbarrow. A great variety of Yellow River junks delivered the stone to the work, these boats returning up stream again by sail or tow line according to the winds. Native picks, shovels and wheelbarrows were the chief implements used. Even the wire cables and hemp ropes were twisted on the job by native hand-operated twisting frames located in a special yard for this work. The whole project, therefore, may be considered a triumph for hand-labor in a country where common labor needs employment and is cheap.

This entire work was financed by the National Government and carried through by a special organization known as the Yellow River Conservancy Commission formed for the purpose of handling this project. Its Chairman, Mr. H. Y. Kung, was Chief Engineer and Managing Director of the work. He was assisted by N. K. Woo, Engineer in Charge, H. Y. Chang, Assistant Engineer in the Kai-feng Office, and Sig. Eliassen,

Assistant Engineer in the field, all members of our Association. My own connection with this work was that of Consulting Engineer or Adviser, and, perhaps I should add "student" for the Yellow River has much yet to teach us all. Its dragons are restless and its silt problem with attendant floods is not yet solved.



Li Tsi Eul being swallowed by the yellow inundation



A farmer in Chao Lo, Northern Kiangsu searching the wreckage of his house



Another view of Li Tsi Eul which was formerly a grain and cattle market



# Two Outstanding Machines

**Lathe and Center Tube Boring Machine produced by Messrs. Craven Brothers  
Probably are largest of their respective types ever built**

Two outstanding pieces of machinery, that are probably the largest of their respective types ever built, are a 355 ton Lathe and a Center Tube Boring machine that have recently been produced at the Vauxhall Works of Messrs. Craven Brothers (Manchester), Limited.

The 355 ton Lathe (height of centers 54-in.), has an overall length of 135-ft. and when used as a single lathe will admit 100-ft. between centers and 46-ft. between centers when used as a double lathe. It comprises two single independent lathes on one bed, each having an all-g geared driving headstock and tailstock, and admitting 46-ft. between the centers and with two front saddles and one rear saddle.

One of these single lathes is made left-handed and the other right-handed, so as to bring the controls to the same side of the machine. Two left-hand and two right-hand saddles are arranged on the front ways of the bed, and one left-hand and one right-hand saddle are arranged on the rear ways of the bed.

After the removal of one tailstock, the machine becomes a single lathe to admit 100-ft. between the centers and, as such, all six saddles can operate simultaneously, the full available length of bed being employed.

The swing over the saddles is 86-in., and the overall length of the bed is 135-ft., its width over the shears being 10-ft.

The driving headstocks are exceptionally strong and rigid. Each is fitted with a 0.55 carbon steel spindle, running in large adjustable gunmetal bearings, with a heavy ball-thrust bearing to take end pressure. The spindle has a large solid flanged end, to which the faceplate is bolted. The enclosed gearing is of heat-treated high-tensile steel, and designed to ensure smooth and silent running and ease of gear-change. The sliding gears are arranged on splined shafts, and the high-speed shafts are mounted in ball and/or roller bearings.

Each headstock is driven by a 150 h.p. variable-speed motor, connected to the first motion shaft by a flexible coupling, and, in conjunction with the gearing, provides spindle speeds in four ranges, the overall range being from 0.5 to 40 revolutions per minute.

The 102-in. diameter faceplates each have four powerful built-in jaws, separately adjustable by steel screws, hand-operated by a ratchet lever. The four front saddles are each equipped with adjustable swivel slide and compound slide-rest, while the two saddles at the rear have non-swivelling rests. Each swivel slide on the front saddles can be set to any

angle and the top tool-slides which they carry have power feed and hand-adjustment.

Two of the front saddles have long swivel slides, the tool-slide being adjustable for a length of one meter. These slides have gearing for screwcutting metric threads from 1 mm. to 30 mm. pitch, in addition to the normal feed which is available with the slide set at any angle. The saddle aprons provide twenty changes of feed, both for sliding and surfacing, ranging from 2 mm. to 250 mm. per minute for sliding, and from 1 mm. to 125 mm. per minute for surfacing. The feed and quick power traverse both for sliding and surfacing, are obtained from a 3 h.p. constant-speed reversing motor on each saddle, and controlled by push-buttons.

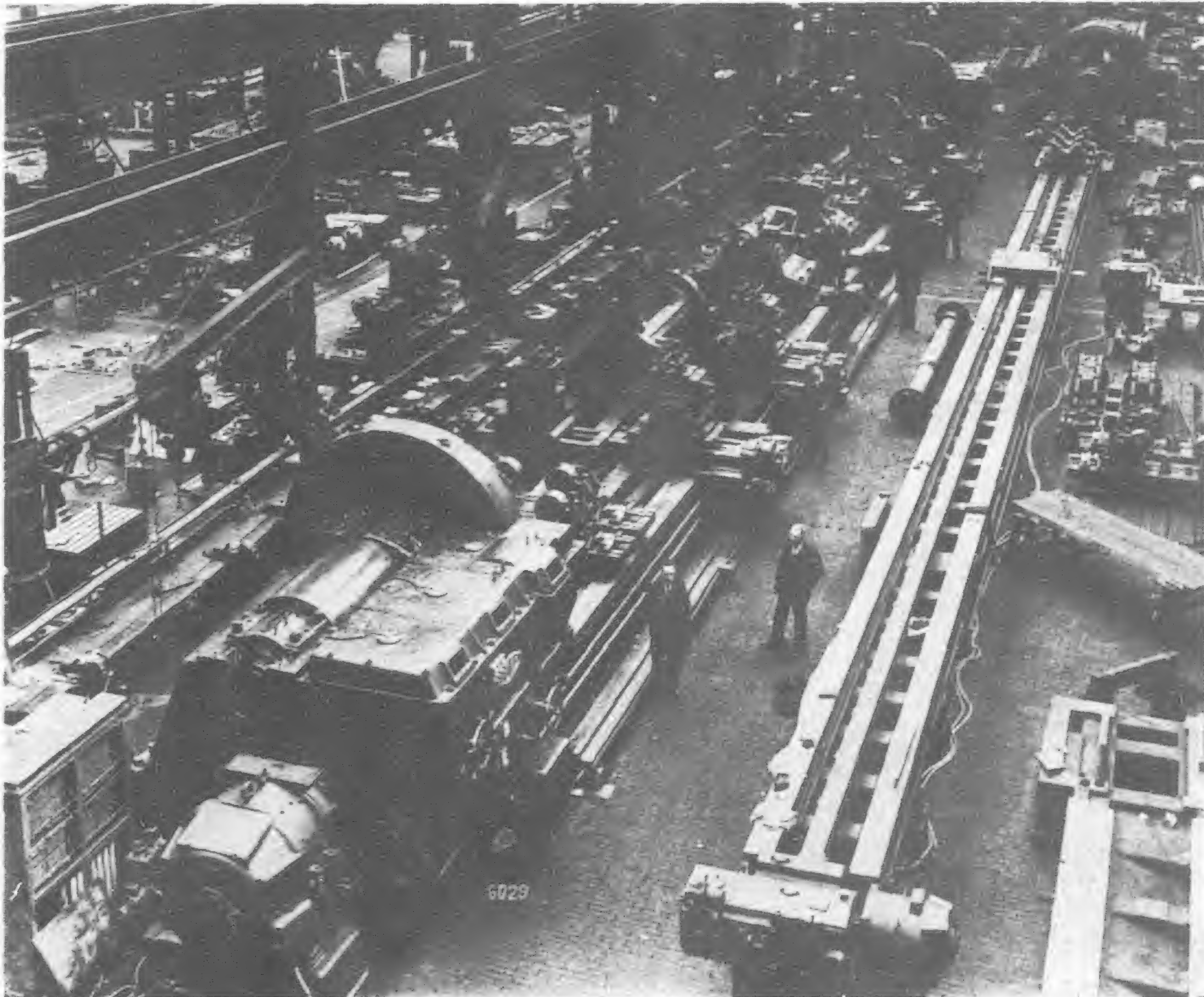
All the apron gearing is of heat-treated steel and all the sliding gears are mounted on splined shafts rotating in ball bearings. Screwcutting may be done by two methods. As previously mentioned, the two saddles with the long swivel slide can cut screw threads up to one meter long, enclosed change gears being arranged to obtain the varying pitches. When this method is employed, the main lever controlling the feed and quick-traverse clutches is brought to a neutral position through the gate provided, and then moved to engage a clutch used for screwcutting purposes only. It is thus impossible to engage the screwcutting gear while the normal feed or quick-traverse is in use.

The second method of screwcutting is by means of a lead screw, arranged at the front left-hand end of the bed for use with one saddle only. The 20 mm. pitch screw is supported at intervals along the bed and is of sufficient length to cut threads ten meters long. The pitch of threads which can be cut from the lead screw, range from 2 mm. to 60 mm. When using this method, the lever operating the clamping nut cannot be engaged until the main feed and quick-traverse control level has been placed in the neutral position. Change gears arranged on a swing frame at the

end of the bed, enable the various pitches to be cut, the gearing being enclosed.

For turning tappers the full length of the lathe, a tangent bar is fitted between the two front shears of the bed, from which the four front saddles are controlled to produce a constant taper of 2 mm. in 1,000 mm. or cones of 4 mm. in 1,000 mm.

Coning gear is provided on the aprons of two front and the two rear saddles, and the arrangement of gears and change-wheels is such that when the longitudinal feed traverse is engaged and the coning gear clutch which meshes with the worm-wheel on the transverse slide screw is also



A view from above of the Giant 355 Ton Lathe, built by Messrs. Craven Brothers



engaged, a movement will be applied to the transverse slide, thus producing the cone or taper required. The change-wheels supplied produce a cone of 4 mm. in 1,000 mm.

Each tailstock is mounted on an intermediate plate, providing adjustment for alignment purposes, and is bolted to the bed. Power adjustment along the bed is by means of a 3 h.p. reversing motor. The steel barrel is supported throughout its length and adjusted quickly by a large handwheel, with final adjustment through a disengageable worm-gear. The center is of the rotating type, carried in a steel sleeve mounted in heavy roller bearings, with a heavy ball-thrust bearing, the complete center being fitted in the enlarged end of the sliding barrel.

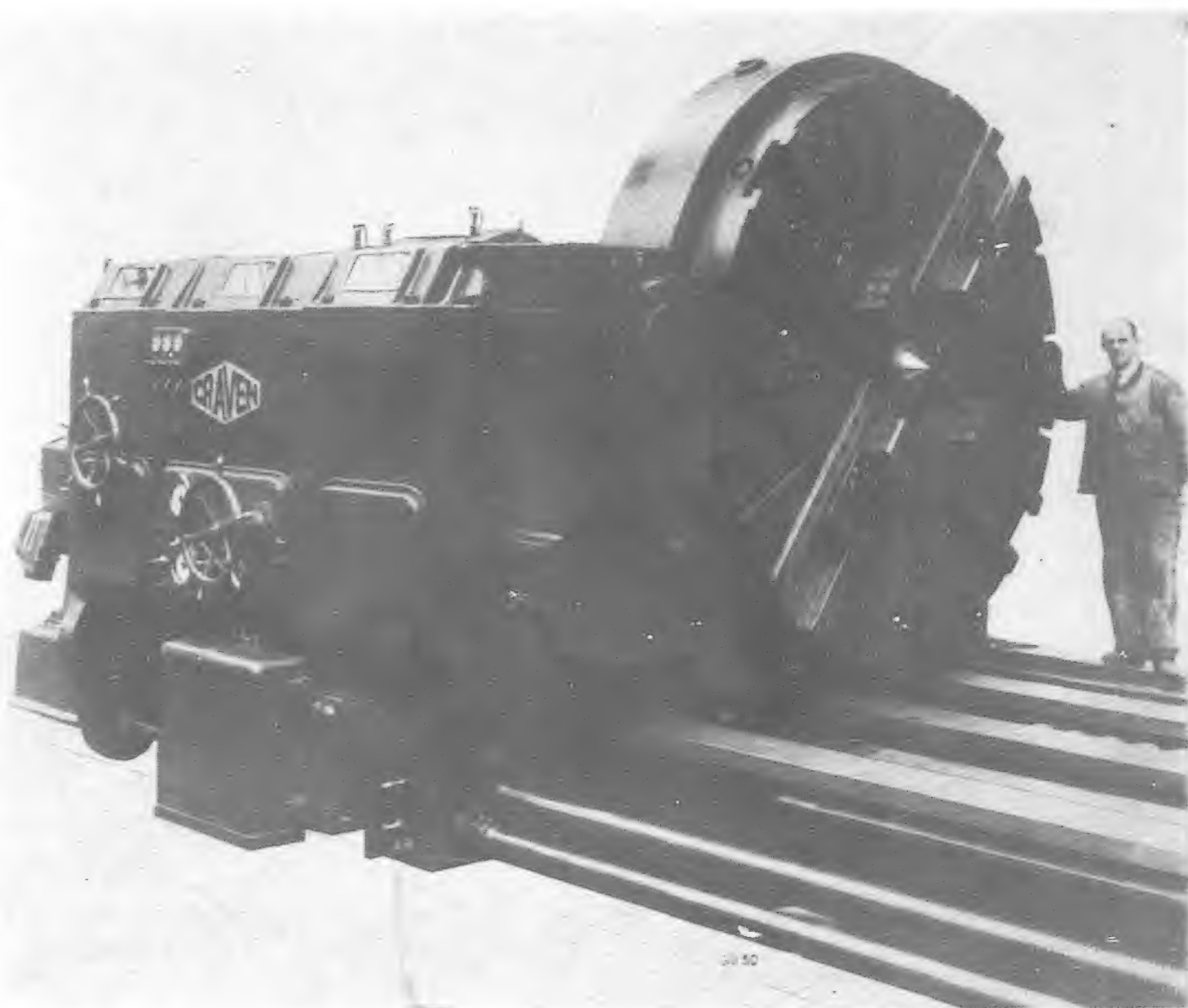
Two single-type roller stays are provided. Each saddle carries two roller supports, which have three seatings for the rollers, to admit work ranging from 36-in. to 72-in. diameter. The supports are adjustable by hand along the saddles to and from the center of the lathe, and can be firmly bolted in position.

Two roller stays of the double type are also provided, these being similar to the single type but fitted with four rollers instead of two. In addition, there are two four-point stationary stays, which admit work from 16-in. to 36-in. diameter.

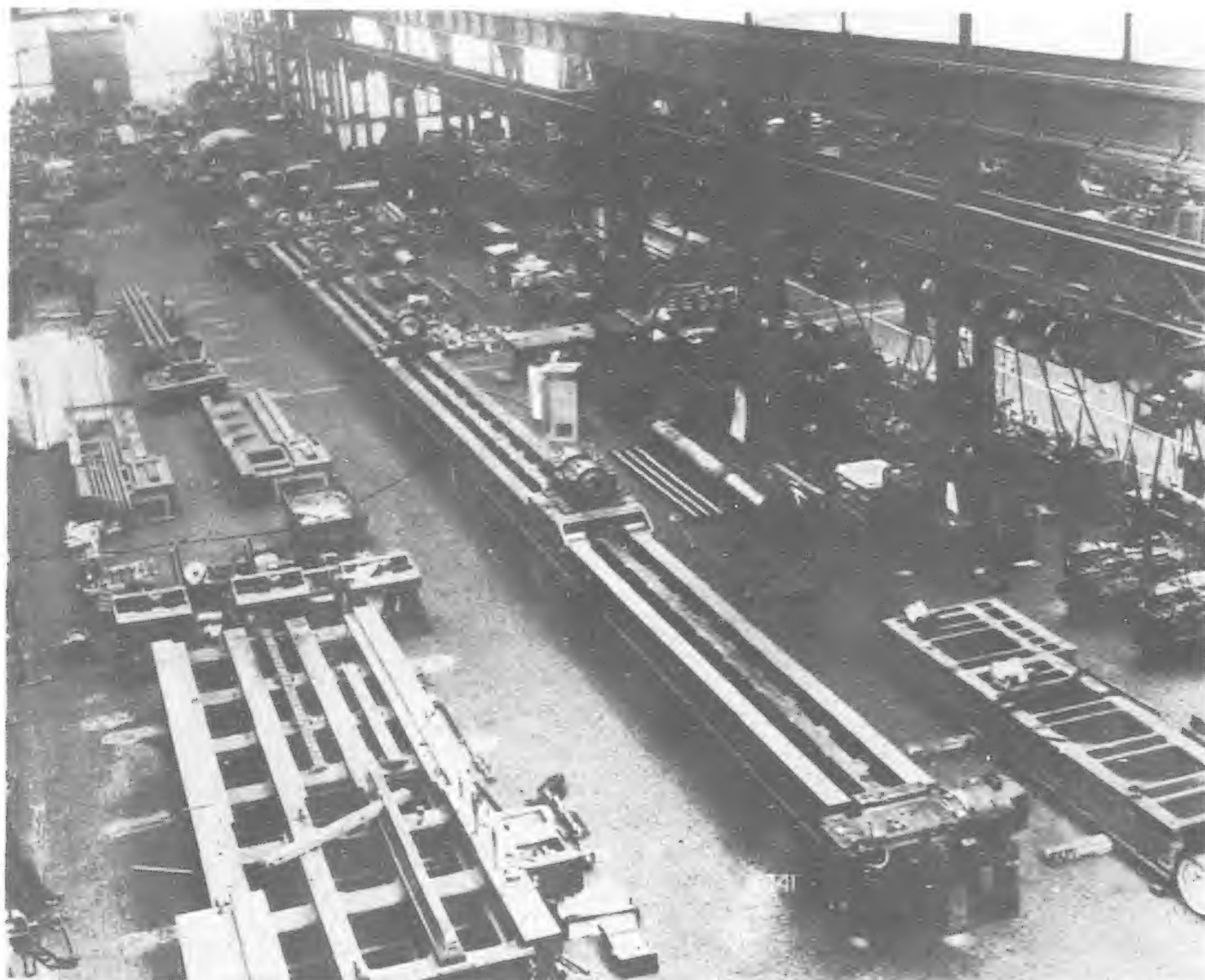
The bed is of the four-shear type, and is made in five lengths, jointed, tongued, and rigidly bolted together. It is provided with accurately cut steel racks, arranged at the front and rear for the traverse of the saddle.

Special attention has been paid to lubrication throughout. On each headstock a force pump supplies filtered oil to the plain bearings, and the gears are sprayed with oil from a gear pump.

A small plunger pump in each saddle lubricates the plain bearings, and the ways of the bed are oiled by a pump which provides a small quantity of oil at frequent intervals for the full traverse of the saddles on the bed. Auxiliary bearings for hand motion shafts, etc., are lubricated by the "one-shot" pump system, and minor details requiring oil occasionally have nipples for use with an oil-gun.



Close-up view of a portion of the Huge Lathe showing one of the driving headstocks



View from above of the Big Tube Boring Machine built by Messrs. Craven Brothers

### "Craven" 51 Inch Center Tube Boring Machine

The machine illustrated herewith as a Tube Borer of the single-ended hollow-spindle type, which embodies many new and interesting features. It will bore tubes up to 100-ft. long, weighing up to 100 tons. On each side of the main driving headstock extend the main bed-plates, each 2-ft. deep and 5-ft. 6-in. wide across the shears, the overall length from end to end of these bedplates (including the headstock) being just over 131-ft. The ends adjacent to the driving headstock are planed and secured by keys and bolts. A machine-cut rack is fitted along the inside face of the bed for the adjustment of the roller stays, etc.

The top bed, which measures 4-ft. across the shears and is 2-ft. deep, is built up in five sections, bolted together to form a continuous bed 124-ft. long. This bed is carried on the foundation, except at its left-hand end, which is planed on the underside, mounted on and bolted to the bedplate.

A 6-in. diameter steel screw is arranged between the ways of the top bed, and is driven by a 10 h.p. variable-speed motor through a change-speed gear-box providing feeds to the boring saddle ranging from 0.0166-in. to 2.5-in. per minute, and a quick-return motion



from 4-ft. to 12-ft. per min. The motor is reversible so that the self-acting feeds and quick return can be used when either "push" or "pull" boring.

The gear-box is situated at the tail end of the top bed and is fitted with a push-button motor-operated clutch to operate the change from feed to quick traverse, with push-buttons arranged on the gear-box and on the main driving headstock.

The boring saddle, mounted on the top bed, is traversed by means of a long gunmetal nut on the underside engaging with the driving screw. The double-gripping pedestal is fitted with gripping steps and caps, the steps being bored to grip a bar 12-in. diameter, and adaptor bushes are provided to grip a 10-in. diameter boring bar.

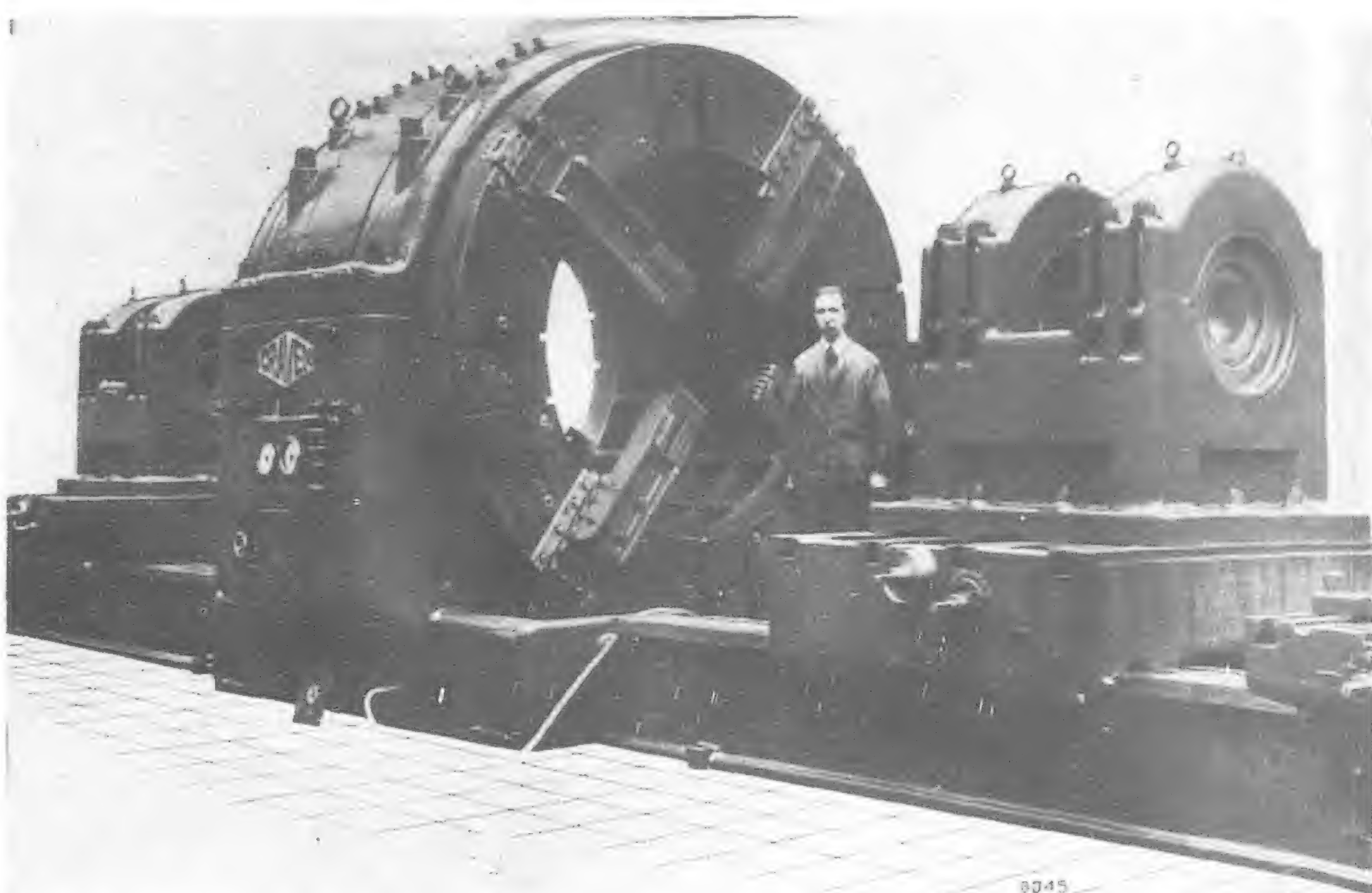
Three guide pedestals are mounted on the bed to support the boring bar. They are capped and have gunmetal steps and adaptor bushes to suit the 12-in. and 10-in. diameter bars. Both the gripping and guide pedestals are arranged to receive adaptor bushes to suit bars of smaller diameter. The driving headstock is a strong box casting fitted with a hollow-spindle revolving in large adjustable double-capped bearings, provided with anti-friction metal pads supplied continuously with oil from a 1 h.p. motor driven pump. The spindle has deep collars at both ends, to each of which is bolted a steel faceplate having four adjustable gripping jaws for gripping work from 24-in. to 72-in. diameter. To cover this range a set of adaptor jaws are provided.

The spindle, which has a 78-in. diameter hole, is fitted with a large cast-steel double-helical wheel, driven through four ranges of high-tensile steel gears carried in a box at the rear of the headstock and directly connected to a 75 h.p. variable-speed motor. The gears are cascaded with oil, and the gear changes are controlled by handwheels outside the gear-box.

In conjunction with the speed variation of the motor, the gear changes provide spindle speeds from 0.5 to 20 revs. per minute, permitting the use of alloy steel tools.

There are three single-type roller stays and one double-type stay arranged on the main bedplate. Each saddle of the single type carries two roller supports, each with four seatings for the rollers, to admit work from 24-in. to 72-in. diameter. To cover this range, the roller supports are adjustable by hand along the saddle to and from the center of the machine and, when set, can be firmly bolted in position. The double roller stay is similar to the single type, but has four rollers. Both types have hand adjustment along the bedplate through worm reduction gear to the rack pinion.

At each side of the driving headstock a stay is situated, to carry a bar for jacket boring. These stays are of heavy design with double-capped gripping pedestals, and are mounted on



Close-up view of section of the Tube Boring Machine showing driving headstock and gripping pedestal

saddles with tee-slots machined in the top surface.

The pedestals have swivel and transverse adjustment on the saddles, so that taper boring can be carried out when required.

Adaptor bushes are provided to grip boring bars of 10-in., 12-in., 13-in., 16-in., 18-in. and 23-in. diameter. When jacket boring a stationary boring bar is used with a traversing cutter head.

A set of motor-driven feed and quick power-traverse gear is provided to clamp on one end of the stationary boring bar, driven by a 3 h.p. reversing variable-speed motor, with a hand-operated clutch for engaging either the feed or quick traverse. The mechanism is complete with pinion and a driving gear on the screw for traversing the cutter head. The range of feeds to the cutter head is from 0.012-in. to 0.9-in. per minute, and the quick traverse range is from 26-in. to 78-in. per minute.

The equipment also includes a compound slide-rest, the bottom slide of which is arranged to bolt to the bedplate at either end of the workpiece. This rest is intended for preliminary boring, and hand adjustment of 20-in. is provided in both the longitudinal and transverse directions.

A plentiful supply of cutting lubricant to the boring tools is provided from a 7½ h.p. motor-driven pump, which develops sufficient force to wash the cuttings out of the hole. The lubricant returns to the tank by means of a trench in the surface of the concrete foundation. The lubrication of the working parts not provided with an oil-bath or forced lubrication, is by means of "one-shot" pressure pumps or a grease gun.

The overall length of the machine is about 259-ft., and the weight, complete, with the exception of the electrical equipment, is 240 tons.

## NEW AIR LINES IN JAPAN

The Japan Air Transport Company, which now operate 2,135 miles of air lines in Japan, Korea, Formosa and Manchuria, opened four new services on October 1, the *Nichi Nichi* reports. Next March the trunk line between Tokyo and Sapporo, the Hokkaido, will be put into service, bringing the total distance to about 3,500 miles.

The four new routes are :

Toyama to Nagano (311 miles).

Tokushima to Kochi, both on Shikoku (79 miles).

Tottori to Matsue, Shimane Prefecture (213 miles).

Tokyo to Nagano to Niigata (231 miles).

Seven planes will be put on the four new lines. These include four Fokkers, four Envoys and a small Beachcraft. Following formal inauguration of the Tokyo-Sapporo run, two 14-passenger Douglas machines will be put into use.

The erection of radio beacons and radio stations between Tokyo and Sapporo and at Yonago, Tottori Prefecture, will be undertaken soon under the direction of the engineering affairs bureau of the Communications Ministry, the *Kokumin* says. They will be used to facilitate flying in foggy weather over the northern route and between Yonago and North Korea.

Short-wave receiving and transmitting stations will be put into operation at Sapporo, Sendai and Aomori and a complete set of radio beacons installed. The station to be built at Yonago will serve the same purpose. All these facilities are scheduled to be completed before March.

Altogether, more than 20 radio stations are to be erected during the next two years. Radio beacons are to be completed between Kagoshima and Naha, in the Loochoo Islands, by March and from there to Taihoku, Formosa, by the end of next year.



# Sulphuric Acid in Japan

## Cost Reductions Follow Technical Improvements

**A** DETAILED account of the progress of sulphuric-acid technology in Japan during recent years was given by Mototarô Matsui in a paper (Group L. No. 19) to the Chemical Engineering Congress of the World Power Conference, held in London recently.

In 1932, the latest year for which detailed statistics are available, the Japanese industry utilized 786,921 tons of pyrites and 4,524 tons of sulphur ore. In addition, about 200,000 tons of sulphuric acid of 50° Bé. was produced from the waste gases from copper smelters, and also about 50,000 tons of the acid from about 66,000 tons of zinc blende used in a zinc smelter.

Japanese sulphuric acid factories in existence and those whose construction is projected are:—

	Chamber System	Tower System	Petersen System	Osame System	Contact Process	Total
Factories existing ..	116	16	7	32	13	174
Projected ..	1	1	4	6	6	18

Leading Japanese firms which supply pyrites are Mitsubishi, Furukawa, Kuhara, Sumitomo and the Fujita concerns, and they have a strong control over the market through the Federation of Mine Ore Producers.

### Pyrites-Burning Methods

Powdered ore is being increasingly used in place of lump pyrites, and in recent years the dust obtained from copper ores by means of the oil-flotation method is being used. Since the ores from Matsuo and Numajiri are mixtures of iron pyrites and raw sulphur ore they do not burn uniformly, and it requires a special technique to treat them in the fines burner. The amount of ore that can be treated per square meter of unit hearth area of a small mechanical fines burner is about 100 kg. against, for the larger burner, from 130—170 kg. A Cottrell precipitator is used to clean the burner gases and to refine the sulphuric acid produced; the precipitation efficiency ranges from 95—99 per cent.

A process in which the burner gases are mixed with electrolytic oxygen is employed in some ammonium sulphate plants. In addition, the Nippon Chisso Hiryo Kaisha is using a method, due to Kôki Kudô, in which oxygen mixed with sulphur dioxide is used to burn the ore, and 16—20 per cent of SO<sub>2</sub> is obtained. Some of it is cooled and circulated so as to adjust the temperature of the burner, with good results.

### Manufacture by the Chamber Method

The output and efficiency of the chamber system in Japan are given as follows:—

	1905	1913	1925	1930
Unit of system, daily output (in tons) ..	13-15	20-30	50-60	80-100
Efficiency of equipment, kg. 50° Bé. acid per cu.m. ..	4-6	5-7	6-8	7-10

In the early days of the industry, the chamber was either oblong or rectangular, but since 1905 the cylindrical form (after Th. Meyer) has been used more extensively. From 1913 on, however, it has been changed to a tall, rectangular shape, and the framework has been changed from wood to steel, with the development of larger factories. For Glover and Gay-Lussac towers, acid-proof cement is being used as mortar to unite stones and bricks, so as to dispense with the outer shell of sheet lead. In some instances the stones of the tower walls are held together by means of sulphur cement. For some Gay-Lussac towers steel plates are used on the outside. Both rectangular and cylindrical towers are constructed.

At one plant, with an efficiency of 7.2 kg. and a rate of nitre consumption of 1.4 per cent on 50° Bé. acid made, irrigation with cold sulphuric acid in the chamber was followed by an increase in efficiency to 8.3 kg. and a reduction in the nitre consumption to 0.56 per cent. Whereas 35 tons was produced with a nitre consumption of 0.8 per cent per day in normal operation, when the

bottom acid was cooled down from 70° C. to 30° C. and circulated again into the chamber, as is done with the Glover tower, the production rose to 42 tons, and the nitre consumption fell to 0.6 per cent.

For the supply of nitric acid, Chilean nitrate is no longer used because of the cost, and oxidation of ammonia is employed. In Japanese plants the rate of nitre consumption (NaNO<sub>3</sub> on 50° Bé. acid made) ranges between 0.3—2 per cent as NaNO<sub>3</sub> (corresponding to 0.06—0.4 per cent as NH<sub>3</sub>).

It is reported that at one plant a good result in changing oxides of nitrogen into N<sub>2</sub>O<sub>5</sub> has been obtained by conducting a gas rich in sulphur dioxide from the burner to the inlet of the Gay-Lussac tower and mixing them, whereby the consumption of NaNO<sub>3</sub> was reduced and the color of the exhaust gas disappeared.

### Introduction of the Tower Systems

The first tower system installed in Japan was on the Opl system, constructed by Sumitomo Hiryo Seizo-sho at Niihama, Ehime Prefecture, in 1914. Since then many plants have been constructed. For a time combinations of the lead chamber and tower systems were employed. The tower system had an efficiency of 20—25 kg. per cu.m.

The Osame system, developed by G. Osame, was established in 1920, its main feature being a scheme wherein several towers are connected *en bloc*, so as to avoid the usual defects of the system. In early stages the towers were arranged in tandem, and gas was sent up from the bottom, but later the towers were assembled closely, and more recently nine towers are arranged in three rows, each block unit comprising three such rows. The gas is conducted up and down alternately through the towers. The erection cost is low and, with normal operation, the amount of acid produced per unit volume is 30—35 kg.; when oxygen from the ammonium sulphate plant is used, the output amounts to 40 kg., and 50—60 kg. when 20 per cent sulphur dioxide is used.

### Catalysts for the Contact Plants

In 1904 the Nobel Company installed the Tentelew system at Hiratsuka, Kanagawa Prefecture, where it is now operated as the Navy Ammunition Plant. In 1916 the Tokyo Ryusan Kaisha (the present Tôryu Kagaku Kogyo Kaisha) obtained the patent rights of the Tentelew system. At that time the Grillo-Schröder system was used, but recently the vanadium catalyst method has also been introduced. Important plants already in existence and those under consideration for construction are:—

Tentelew system ..	{ Tôryu Kagaku Kogyo Kaisha (Oshima, Tokyo). The Navy Ammunition Plant (Hiratsuka).
Allied to the Tentelew method ..	{ The Army Ammunition Plant (Oji and Iwahana).
Grillo system ..	{ Miike Senryo Kaisha (Omuda). Nihon Senryo Kaisha (Kasugade, Osaka).
Mannheim system ..	{ Dai Nihon Jinzo Hiryo Kaisha (Owada, Osaka). Nihon Senryo Kaisha (Kasugade, Osaka).
Lurgi system ..	{ Nihon Soda Kaisha (Takaoka, Fukui Prefecture).
Selden system ..	{ Sumitomo Kagaku Kogyo Kaisha (Niihama, Ehime). Miike Senryo Kaisha (Omuda). Toyo Koatsu Kogyo Kaisha (Omuda).
Monsanto system ..	{ Dai Nihon Tokukyo Kiryo Kaisha (Oshima). Nihon Kari Kogyo Kaisha (Yokohama). Tôryu Kagaku Kogyo Kaisha (Yokohama) and others

Research work on catalysts was started by Matsui and his collaborators in 1931. In the experiments, a mixture containing SO<sub>2</sub> and air was passed into the apparatus, the temperature was controlled within 1° C., and the exit gas was analysed, with results as follows: SO<sub>2</sub> was converted on the Pt-MgSO<sub>4</sub> system above 450° C.; on the Ba-V system above 450° C.; on the Ag-V system above 470° C. with a theoretical yield. No influence of As upon the V catalyst of these two systems was recognized. In work on the temperature co-efficient of reaction velocity at 450° C. the value of the Pt-MgSO<sub>4</sub> system was 1.29 and of the Ba-V system



1.40 as compared with 1.16 for platinum asbestos. The work is being continued. Using the experimental results as basis, and assuming gases containing five per cent  $\text{SO}_2$ , and 16 per cent  $\text{O}_2$ , with conversions at 95 per cent, in order to produce one ton of  $\text{H}_2\text{SO}_4$ , the following data are obtained:—

Carrier Catalyst	Pt	$\text{V}_2\text{O}_5$	Optimum Tempera- ture ° C.	Catalyst	Vol.	Pt	$\text{V}_2\text{O}_5$
	%	%		kg.	l.	gr.	gr.
$\text{MgSO}_4$ -Pt ..	0.1	—	490	113	130	113	—
Silica gel-Ba-V ..	—	6.0	500	99	300	—	5,950
Silica gel-Ag-V ..	—	15.2	500	52	150	—	7,900

### The Industry's Capacity and Working Costs

Production efficiency per annum (365 days) at 10° ton 50° Bé. acid is:—

	Chamber System	Tower System	Petersen System	Osame System	Contact Process	Total
Factories existing ..	2,019	203	350	964	390	3,926
Projected ..	29	25	219	173	278	1,724
Total ..	2,048	228	569	1,137	668	4,650

The actual production, however, is 20—25 per cent less than the figures shown above. The largest plant in Japan utilizes two Petersen units, having a capacity of 450 tons at the Shisakajima smelter. Others have tower and lead-chamber processes of about 120 tons capacity. The factory having the largest output is the Chosen Chisso Hiryo Kaisha at Konan, Chosen, with a capacity of 1,200 tons, whilst amongst others are the Showa Hiryo Kaisha at Kawasaki (Kanagawa Prefecture), having 600 tons capacity, the Manchoukuo Kagaku Kogyo Kaisha at Kanseishi (600 tons), and Nihon Jinzo Hiryo Kaisha (about 1,900 tons from 13 plants). Some of the rayon manufacturing establishments produce their own acid.

Figures on the costs of production of sulphuric acid in Japan were finally given by the author. Dealing, first, with the chamber, tower and allied systems, the following figures were given. They are "all-in" costs (inclusive of raw materials, power, labor, maintenance and depreciation), and are in yen per ton of 50° Bé. acid expressed in terms of 100 per cent sulphuric acid, and are calculated for a plant with a capacity of 100 tons of 50° Bé. acid per day: Ordinary chamber, 17.47; acid-irrigated chamber, 17.01; tower system, 17.04; improved tower system, 16.70; and smelter gas (no charge for the sulphur), Y.11.89.

In regard to the contact system, in its various modifications, Matsui gives the total cost of production (in yen) per ton of 100 per cent  $\text{H}_2\text{SO}_4$  as follows: Tentelew system, 24.32; Grillo system, 18.91; Lurgi system, 20.33; Monsanto system, 17.57; and Japanese (modified vanadium catalyst) system, Y.16.36. In this comparison, it is to be noted, the daily rate of output of acid by the various systems is not the same, but is 14 tons, 30 tons, 30 tons, 50 tons, and 100 tons respectively.—*The Chemical Trade Journal*.

### The Soviet Gold Industry

(Continued from page 434)

non-aggression pacts. Later, Russia was given the chance to play host to Anthony Eden, Britain's dapper negotiator of important foreign pacts. The British made no commitments, but they were impressed with Moscow.

Economically, Moscow's successes have been almost as striking. The Russians produced more pig iron than the United States in the last quarter of 1934. They now generate more electric power than Great Britain. By buying abroad a little less each year than they were able to sell to foreign countries, the Russians have accumulated enough to pay off nearly \$700,000,000 of foreign credits in the last four years. The best guess now is that Moscow owes less than \$150,000,000 outside the country. If, now, Moscow can round off this record with the largest gold production in the world, it should lift Russia to a place of permanent importance.

Russia has the enormous task ahead of developing an area almost three times the size of the United States with resources not yet even completely surveyed. No one knows better than Moscow how foolhardy it would be to push old dreams of a world revolution.

### Japan and the Singapore Market

(Continued from page 430)

ways in which British firms can help themselves without Government intervention. It is doubtful, however, whether there would be any support for a general proposal that the British should emulate the Japanese and make only one profit out of one transaction instead of several profits—one for the broker, one for the shipper, one for the insurance firm, one for the banker, and so on.

The *Straits Times* comments:

British merchants, British shippers, and British bankers can do a great deal, even without the support of Governments, to maintain British trade supremacy in Malaya. The Japanese policy of overbidding in the commodity markets could be overcome if British interests would copy the example of intensive co-operation and temporary sacrifice for the long-term benefit. If they could resist the temptation of the extra one-quarter to three-eighths of a cent on a portion of their rubber, for instance, and confine their dealings to British concerns for at least a year, an entirely different situation would arise.

Other newspapers in Singapore point out the danger of retaliatory action by Japan if new trade restrictions are introduced, but there is general agreement that, while the merchant community admire the intense loyalty and industry which have won for the Japanese their present strong position, if the British firms here are content to allow their rivals complete liberty of action until they dominate the markets entirely they cannot hope to continue much longer in business in Singapore.

It is likely that a statement on the Government's attitude to the problem will be made by Sir Shenton Thomas, the Governor, when he returns in September after a visit to London.

### Colombo Harbor Improvements

It is understood that a commencement is shortly to be made with the next step in the plans for the improvement of the Port of Colombo—the construction of the Wet Dock Quay and the Oil Basin. The proposal is that a large tract of marshland lying in the vicinity of Alutmawatte should be acquired for the purpose.

The construction of the Wet Dock Quay need not immediately be undertaken, but the filling up of the marshland might, it is felt, be proceeded with as a preliminary measure while the building of the Inner Dry Dock is in progress.

This scheme, the completion of which is expected to take about 2½ years, was started on August 8 last year, the Minister of Communications and Works cutting the first sod at a ceremony held on that day.

While the provision of the Wet Dock Quay and the Oil Basin is not necessarily a corollary to the Inner Dry Dock Scheme which is now in progress, it is pointed out that the early acquisition of the land necessary for the Wet Dock Quay of the future would greatly facilitate the progress of the whole scheme of Colombo Harbor Improvements.

Large volumes of loose spoil are now available as a result of the excavation for the Inner Dry Dock which is now in progress. This spoil is now being dumped on private land, the owners of which are being paid a consideration. It is urged that it would be more profitable to use this spoil to fill the portion of the swamp which will be required for the Wet Dock Quay.

It is also suggested that the harbor dredgings, which are now dumped out in deep sea, might be diverted to the same swamp so as to expedite its filling up.

It is learned that the Executive Committee of Communications and Works felt that it should not sanction the immediate acquisition of the land required, but that the matter should await the attention of the new Executive Committee owing to the importance of the scheme and the large expenditure entailed.

Plans for the new scheme are now complete and, as stated by the Minister of Communications and Works when it is completed "there would be no serious rival to the Port of Colombo which would then be second to none in the whole world."



# Engineering Notes

## INDUSTRIAL

**NEW FOREST DISCOVERED.**—A vast forest stretching over 433 square *li* has been discovered on the mountainous region of Lifan, north-west of Chengtu.

The newly-discovered forest, it is stated, is capable of supplying good materials for railway sleepers.

**JAPANESE RAYON.**—The output by members of the Japan Rayon Association during April was 20,904,300 lb., against 20,106,630 lb. in March and 18,514,630 lb. in February. The production constitutes another record, but it is not yet known how much has gone into consumption. Under the curtailment regulations a considerable quantity is deposited in "joint storage" as surety for the sealing of spindles.

**TEXTILE COMBINAT.**—One of the largest textile combinats in the U.S.S.R. at Tashkent will go into production during the last quarter of this year. By the end of the year 100,000 spindles, 3,264 weaving looms and twelve stamping machines will be in operation. An electric power station with a capacity of 18,000 kw. is being constructed to supply power and steam to the factory.

**JAPANESE STAPLE FIBRE.**—The Japan Cotton Weavers' Association has decided to send a petition to the Ministry of Commerce requesting permission for the association to control the output of staple fibre. Staple fibre has recently started being boomed as a substitute for raw wool, with the result that the cotton weavers and the rayon manufacturers are competing for the right to control the production of staple fibre piece goods.

**JAPAN'S INDIAN TRADE.**—Ceylon is buying more British goods, says the *Times of Ceylon*. The island's total trade with Empire countries last year improved by £1,500,000, and trade with foreign countries decreased correspondingly.

The island took 13,497,663 yards of bleached cotton from the United Kingdom last year, compared with 1,423,868 yards from Japan.

**LARGEST BALL-BEARING PLANT.**—The new Ball-bearing Plant now being constructed at Saratov will have an annual production of about 50,000,000 ball bearings of 250 different types. The erection of the plant is planned alongside the Volga outside the City of Saratov. It will occupy an area of 70 hectares and will employ 27,000 workers. 8,000 lathes and machines will be used in the equipment of the plant.

**JAPAN'S IMPORTS INCREASE.**—The activity of the armament industry in Japan, and consequent increases in imports of cotton, wool, crude oil and machinery, is the main cause assigned to the unfavorable trade balance of Y.311,332,000 (about £18,000,000) shown in the period January 1 to June 15.

Imports show an increase of some Y.114,000,000 (about £6,700,000), compared with the same period last year.

**NEW PLANT.**—The large amount of building which is now being carried out all over the U.S.S.R., has brought about the necessity for mechanization of the building industry to the utmost extent. For this, new plant will be required. It is exceedingly doubtful whether the Soviet factories can cope with the demand, and the speed with which building plans are put into operation necessitates the ready supply of machinery. Specialized building trusts have been created by the Council of Labor and they will take charge of the question of the supply of machinery, etc.

**IRON AND STEEL.**—An increase in the Japanese production of iron and steel in the near future is foreshadowed by an announcement that the Japan Iron Manufacturing Company is issuing additional shares.

The company has decided to issue debentures amounting to Y.200,000,000 (£11,700,000) in order to secure funds for increasing output over the next five years.

The Japan Iron Manufacturing Company is capitalized at Y.360,000,000 (£21,000,000). It was organized in 1935, with the object of making Japan self-sufficient as regards iron and steel needs, and includes the Yawata Iron Works and six other iron and steel manufacturing corporations.

## RAILWAYS

**CHINESE RAILWAY ORDER.**—The Belgian Government expressed its willingness to act as guarantor for an order from China for £3,000,000 worth of railway material, including rolling stock.

**TSINAN-KAIFENG RAILWAY.**—A proposal that a railway be built along the southern embankment of the Yellow River to link Tsinan, capital city of Shantung, with Kaifeng in Honan, is contained in a telegram jointly addressed by the people in Shantung and Kiangsu to the two provincial governments concerned. The proposal, it is understood, has been referred by the provincial governments to the National Economic Council for consideration.

## SHANGHAI'S BUSIEST ERRAND BOY



He is always at attention . . . ready to do your bidding. He will take an urgent message and bring you back an answer; he will make appointments, keep you in touch with your friends, invite your guests; he will go to the grocery store, the theatre, your club; he will call the doctor, the police, the fire brigade. He can be trusted to carry out each order right and promptly.

He pays no heed to the weather. In July heat or December sleet, he never hesitates, never falters. He gets the job done, saves you time, worry, effort and money . . . and back he comes, waiting for your next order.

He is neat, quiet, well-behaved. He doesn't loiter, doesn't argue. Never wants a day off; he is blessed with a robust constitution, and works twenty-four hours a day, seven days a week. Best of all he asks only a reasonable wage . . . \$6.50 a month to serve you in your home. Don't you want to engage this errand boy?

SHANGHAI TELEPHONE COMPANY  
232 KIANGSE ROAD - TEL. 94090





**HANKOW-CANTON LINE OPENED.**—The Hankow-Canton Railway was formally opened to traffic on September 1, when the first train was due to leave Canton for Wuchang. The first train from Wuchang to Canton was scheduled to leave on September 4.

**HANGCHOW RAILWAY DEVELOPMENT.**—Construction work on the unfinished section between Hangchow and Tsao-o-kiang, on the Shanghai-Hangchow-Ningpo Railway, will be started shortly. Tenders for the engineering work was opened recently—*Kuo Min*.

**NEW RAILWAY WORKSHOP.**—A preparatory bureau will be organized by the Ministry of Railways for making necessary preparations for the construction of a big railway workshop in China. Chuchow, an important town along the Canton-Hankow Railway in Central Hunan, was chosen as the site for the new workshop.

**NEW RAILWAY PLAN.**—The South Manchuria Railway is to provide material and technical experts for the new railway to be built across Hopei, linking Tsangchow with Shihchiachwang. An announcement to this effect was made recently by Mr. Sogo, general manager of the Hsinchung Co., a branch of the South Manchuria Railway Co. charged with plans for the economic development of North China.

**JAPAN'S RAILWAY TIMBERS.**—Chemical treatment of railway ties will be started soon by the Japanese railways. While railway ties in Europe and America are made to last from 20 to 30 years, Japan wastes millions of yen by replacing them about every seven years. Annual replacements of 4,000,000 timbers costs the Government Railways Y.8,800,000. The treatment planned will increase the cost per tie, but will lengthen the period of service three or four times. The resultant decreased cutting of timber in Japanese forests will protect mountain river sources and reduce the menace of floods.

**MANCHOUKUO RAILWAY EXTENSIONS.**—The South Manchuria Railway Company has decided to build new railways in North Manchuria of a total length of 2,500 kilometers and costing Y.200,000,000. The proposed construction is connected with the expansion of Manchoukuo railways, in conformity with Manchoukuo's immigration policy and has nothing to do with the enterprises of the S.M.R. proper. Cost of construction is estimated at about Y.80,000 per kilometer. The idea would be to build 500 kilometers a year and complete the task in five years. The railway company has completed its third railway construction program for the Manchoukuo Government and the new construction would be the fourth.

## RICHARD FIRTH

Telegraphic Address: **& SONS LTD.** Codes: ABC (5th Edition)  
 "TEXTILES,"  
 CLECKHEATON **BROOK MILLS,** and BENTLEY'S

**CLECKHEATON ENGLAND**

**WOOLLEN AND WORSTED**

**MACHINERY MAKERS**

**AND EXPORTERS**

Sole Agents: **THE JARDINE ENGINEERING CORPORATION LTD.**  
 Shanghai, Tientsin and Branch Offices

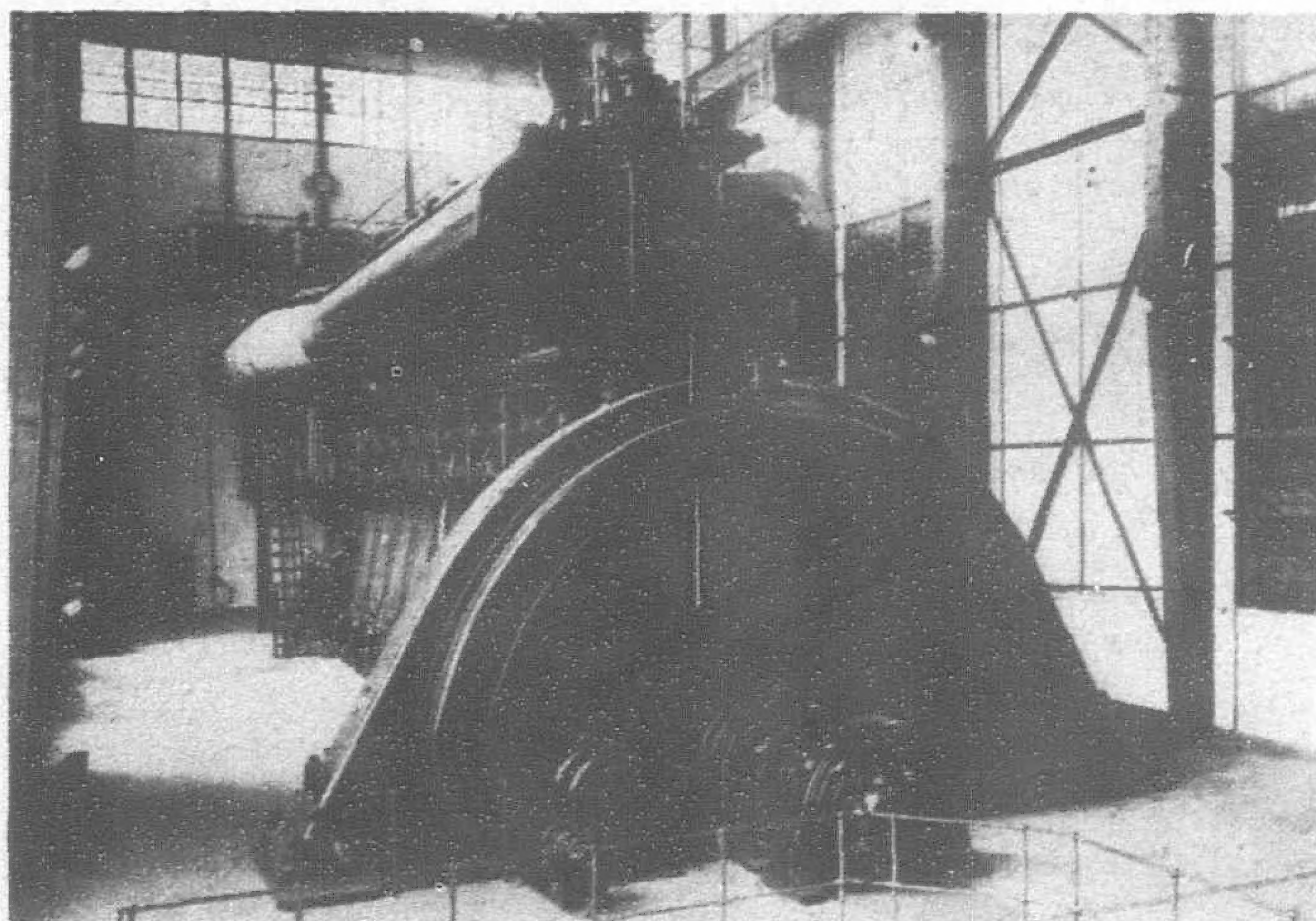
# SULZER BROTHERS

## SHANGHAI ENGINEERING OFFICE

34 AVENUE EDWARD VII.

Telegraphic Address  
 "SULZEBROS" SHANGHAI  
 Telephone 16512

蘇爾壽工程事務所  
 上海愛多亞路三四號  
 本公司常備樣本供奉各界  
 垂詢工程事務亦易誠酬答



Compagnie Francaise  
 de Tramways et  
 d'Eclairage Electriques  
 de Shanghai  
 New Power Station  
 Lu Ka Wei  
 equipped with a  
**Sulzer** double-acting,  
 two cycle Diesel  
 Engine, 11,400 b.h.p.

**WINTERTHUR. SWITZERLAND.**